



# VIGO COUNTY SECURITY CENTER

Terre Haute, Indiana

**PROJECT MANUAL**

**Volume 2**

**Specification Divisions 03 - 13**

**CONSTRUCTION DOCUMENTS**

**September 5, 2019**



**ARCHITECT / ENGINEER**

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**DLZ Project #1663-1190-90**



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## SIGNATURE SHEET FOR

**Vigo County  
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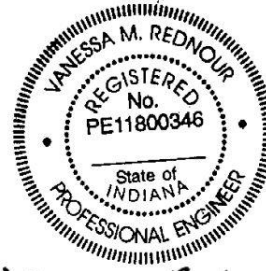
Terre Haute, Indiana

Each seal applies to its designated discipline.



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END OF SECTION 000002



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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. Shoring, bracing, and anchoring.

## B. Related Requirements:

- 1. Section 032000 "Concrete Reinforcing" for reinforcement required for concrete.
- 2. Section 033000 "Cast-In-Place Concrete" for cast-in-place concrete.
- 3. Section 321313 "Concrete Paving" for formwork related to 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. Shoring procedures.
    - e. 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. Form ties.
  - 4. Waterstops.
  - 5. Form-release agent.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing and inspection agency.
- B. Field quality-control reports.
- C. Minutes of preinstallation conference.

## 1.7 QUALITY ASSURANCE

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

## 1.8 DELIVERY, STORAGE, AND HANDLING

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

## 2.2 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.
    - 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. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer-modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

1. Products: Subject to compliance with requirements, provide the following:
  - a. Sika Greenstreak, Hydrotite

## 2.4 RELATED MATERIALS

### A. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4-inch, minimum.

### B. 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.

### C. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1-inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1-inch in diameter in concrete surface.
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.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
  1. Surface Finish-3.0: ACI 117 Class A, 1/8-inch.
- D. Construct forms tight enough to prevent loss of concrete mortar.
  1. Minimize joints.
  2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
  1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
  2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
  1. Provide and secure units to support screed strips
  2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
  1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.

2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
  1. Determine sizes and locations from trades providing such items.
  2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction 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. Locate joints 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.

### 3.3 INSTALLATION OF WATERSTOPS

- A. 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 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: Owner will 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



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## SECTION 032000 - CONCRETE REINFORCING

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

- B. Related Requirements:

- 1. Section 031000 "Concrete Forming and Accessories" for forming and accessories of cast-in-place concrete.
  - 2. Section 033000 "Cast-In-Place Concrete" for cast-in-place concrete.
  - 3. Section 034100 "Precast Structural Concrete" for reinforcing used in precast structural concrete.
  - 4. Section 321313 "Concrete Paving" for reinforcing related to concrete pavement and walks.

## 1.3 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.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

- 1. Each type of steel reinforcement.
    - 2. Bar supports.

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

1. Include placing drawings that detail fabrication, bending, and placement.
  2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
1. Location of construction joints is subject to approval of the Architect.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Minutes of preinstallation conference.

#### 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, 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.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

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

### PART 2 - PRODUCTS

#### 2.1 STEEL REINFORCEMENT

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

#### 2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless-steel bar supports.
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508-inch diameter.

## 2.3 FABRICATING REINFORCEMENT

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

## PART 3 - EXECUTION

### 3.1 PREPARATION

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

### 3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
  1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
  2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24-inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.
3. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
  - a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12-inches.
2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2-inches for plain wire and 8-inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

### 3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement.
  2. Continue reinforcement across construction joints unless otherwise indicated.
  3. Do not continue reinforcement through sides of strip placements of floors and slabs.

### 3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

### 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: Owner will 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.

END OF SECTION 032000

## SECTION 033000 - CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

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

- B. Related Requirements:

- 1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
  - 2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
  - 3. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
  - 4. Section 321313 "Concrete Paving" for concrete pavement and walks.

## 1.3 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.

## 1.4 PREINSTALLATION MEETINGS

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

## 1.5 ACTION SUBMITTALS

- A. Product Data: for each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

## C. Shop Drawings:

1. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
2. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
  - a. Location of construction joints is subject to approval of the Architect.

## 1.6 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. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.
- C. Preconstruction Test Reports: For each mix design.
- D. Field quality-control reports.
- E. Minutes of preinstallation conference.

## 1.7 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 with experience installing and finishing concrete.
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 shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
  - D. Field Quality Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
    1. Personnel conducting field tests shall be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
- 1.8 PRECONSTRUCTION TESTING
- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
- 1.9 DELIVERY, STORAGE, AND HANDLING
- A. Comply with ASTM C94/C94M and ACI 301.
- 1.10 FIELD CONDITIONS
- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
    1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
    2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
    3. Do not use frozen materials or materials containing ice or snow.
    4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
    5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
  - B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
    1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
    2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.



## PART 2 - PRODUCTS

## 2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 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.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Silica Fume: ASTM C1240 amorphous silica.

## C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4-inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

## D. Air-Entraining Admixture: ASTM C260/C260M.

## E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

## F. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

## 2.3 VAPOR RETARDERS

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

1. Products:

- a. W.R Meadows, Inc; Perminator 15 mil.
- b. Steel Industries, LCC; Stego Wrap, 15 mil.
- c. Insulation Solutions, Inc; Viper VaporCheck 16 mil.

## 2.4 LIQUID FLOOR TREATMENTS

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

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Dayton Superior; Pentra-Hard EDH Exterior Densifier.
- b. Approved Equal.

- C. Penetrating Liquid Floor Finish, Typical:

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Dayton Superior; Pentra-Hard Guard.
- b. Scofield Formula One Guard W.
- c. Approved Equal.

## 2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. BASF Corporation; Construction Systems.
- b. ChemMasters, Inc.
- c. Dayton Superior.
- d. Euclid Chemical Company (The); an RPM company.
- e. L&M Construction Chemicals, Inc.

- f. Sika Corporation.
  - g. W. R. Meadows, Inc.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
  - 1. Color:
    - a. Ambient Temperature Below 50 deg F: Black.
    - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
    - c. Ambient Temperature Above 85 deg F: White.
- D. Water: Potable or complying with ASTM C1602/C1602M.

## 2.6 RELATED MATERIALS

- A. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
  - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

## 2.7 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch 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 or coarse sand, as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4100 psi 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 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 or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

## 2.8 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.
  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, concrete for heavy-use industrial slabs concrete for parking structure slabs, and concrete with a w/cm below 0.50.

## 2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings and Foundation Walls: Normal-weight concrete.
  1. Minimum Compressive Strength: 4000 psi at 28 days.
  2. Maximum W/C Ratio: 0.42.
  3. Slump Limit: 4 inches, plus or minus 1-inch.
  4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

B. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.42.
3. Minimum Cementitious Materials Content: 540 lb/cu. yd.
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

C. Concrete Toppings: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water/Cement Ratio: 0.35.
3. Slump Limit: 8 inches, plus or minus 1 inch.
4. Air Content: Do not allow air content of trowel-finished toppings to exceed 3 percent.

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94 and ASTM C1116, and furnish batch ticket information.

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.

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

### 3.5 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 into concrete.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

5. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
  6. Use 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. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
  2. Terminate full-width joint-filler strips not less than 1/2-inch or more than 1-inch 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.

### 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, 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.
    - a. Do not use vibrators to transport concrete inside forms.
    - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- 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 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
    - a. Patch voids larger than 1-1/2-inches wide or 1/2-inch deep.



- b. Remove projections larger than 1-inch.
    - c. Tie holes do not require patching.
    - d. Surface Tolerance: ACI 117 Class D.
    - e. Apply to concrete surfaces not exposed to view.
  - 2. ACI 301 Surface Finish SF-3.0:
    - a. Patch voids larger than 3/4-inch wide or 1/2-inch deep.
    - b. Remove projections larger than 1/8-inch.
    - c. Patch tie holes.
    - d. Surface Tolerance: ACI 117 Class A.
    - e. Locations: Apply to concrete surfaces exposed to view.
- B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
- 1. Grout-Cleaned Rubbed Finish:
    - a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
    - b. Do not clean concrete surfaces as Work progresses.
    - c. Mix 1-part Portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white Portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
    - d. Wet concrete surfaces.
    - e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
- C. Related Unformed Surfaces:
- 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
  - 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.8 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. Scratch Finish:
  - 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
  - 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4-inch in one direction.
  - 3. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

## C. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and resinous terrazzo finish.

## D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

## a. Slabs on Ground:

- 1) Specified overall values of flatness,  $F_F$  25; and of levelness,  $F_L$  20; with minimum local values of flatness,  $F_F$  17; and of levelness,  $F_L$  15.

## E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

## F. 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. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4-inches high unless otherwise indicated on Drawings, and extend base not less than 6-inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
  - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - b. Cast anchor-bolt insert into bases.
  - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

### 3.10 CONCRETE CURING

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

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

#### B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

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

4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
  - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
  - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
  - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
  - d. Water-Retention Sheetting Materials: Cover exposed concrete surfaces with sheetting material, taping, or lapping seams.
- C. Curing Unformed Surfaces: Comply with ACI 308.1as follows:
  1. Begin curing immediately after finishing concrete.
  2. Interior Concrete Floors:
    - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
      - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
        - a) Lap edges and ends of absorptive cover not less than 12-inches.
        - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
      - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12-inches, and sealed by waterproof tape or adhesive.
        - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
        - b) Cure for not less than seven (7) days.
      - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven (7) days, utilizing one, or a combination of, the following:
        - a) Water.
        - b) Continuous water-fog spray.
    - b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

- 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
  - a) Lap edges and ends of absorptive cover not less than 12-inches.
  - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven (7) days.
- 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
  - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
  - b) Cure for not less than seven days.
- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
  - a) Water.
  - b) Continuous water-fog spray.
- 4)

c. Floors to Receive Urethane Flooring:

- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
- 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6-inches and sealed in place.
- 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
- 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

3.11 TOLERANCES

- A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than seven days' old.
  3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
  4. Rinse with water; remove excess material until surface is dry.
  5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

### 3.13 JOINT FILLING

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

### 3.14 CONCRETE SURFACE REPAIRS

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

- c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
    - d. Fill and compact with patching mortar before bonding agent has dried.
    - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement, so that, when dry, patching mortar matches surrounding color.
    - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
    - b. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
    - a. Correct low and high areas.
    - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  3. After concrete has cured at least 14 days, correct high areas by grinding.
  4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
    - a. Finish repaired areas to blend into adjacent concrete.
  5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
    - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
    - b. Feather edges to match adjacent floor elevations.
  6. Correct other low areas scheduled to remain exposed with repair topping.
    - a. Cut out low areas to ensure a minimum repair topping depth of 1/4-inch to match adjacent floor elevations.

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

### 3.15 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 shall 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 shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
  - 3. Testing agency shall 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 shall 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 shall be performed in accordance with the following requirements:
  1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
    - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:
  - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
  - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
  - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
  - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. 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 by 12-inch cylinder specimens for each composite sample.
  - b. Cast, initial cure, and field cure two sets of two standard cylinder specimens for each composite sample.
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 shall 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 shall 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 if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
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 shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
  - 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 shall be in accordance with ACI 301 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.

- F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

### 3.16 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 034100 - PRECAST STRUCTURAL CONCRETE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes:

- 1. Structural design, fabrication and erection of precast structural concrete work including wall panels with an architectural finish. Also included are accessories for anchoring to the building framework and the design, installation and fabrication for permanent and temporary anchors and brackets for these panels and planks.

## B. Related Sections:

- 1. Section 033000 - "Cast-in-Place Concrete" for concrete topping and placing connection anchors in concrete.
- 2. Section 034130 - "Precast Prestressed Hollow-Core Slab Units" for floor composition at mezzanine levels attaching to precast wall panels.
- 3. Section 051200 - "Structural Steel Framing" for furnishing and installing connections attached to structural-steel framing.
- 4. Section 055000- "Metal Fabrications" for kickers and other miscellaneous steel shapes.
- 5. Section 072119 "Foamed-In-Place Insulation for insulating exterior vertical joints between precast structural concrete wall panels.
- 6. Section 076200 - "Sheet Metal Flashing and Trim" for flashing receivers and reglets.
- 7. Section 078413 - "Penetration Firestopping" for joint-filler materials for fire-resistance-rated construction.
- 8. Section 078443 "Joint Firestopping" for firestopping vertical joints between fire-rated precast structural concrete wall panels.
- 9. Section 079200 - "Joint Sealants" for elastomeric joint sealants and sealant backings.
- 10. Section 079513 - "Expansion Joint Cover Assemblies" for building expansion joints within the precast concrete panels.
- 11. Section 099113 - "Exterior Painting" for painting troweled finish precast concrete panel.
- 12. Section 099123 - "Interior Painting" for painting troweled finish interior precast concrete panel.
- 13. Division 22 - "Plumbing" for plumbing embed items and openings including piping, hose bibbs, downspout nozzles and any other miscellaneous items located on the interior and exterior faces of the precast panels.

14. Division 26 - "Electrical" for electrical embed items and openings relating to conduit, lighting control devices, receptacles and lighting located on the interior and exterior faces of the precast concrete panels.
15. Division 27 - "Communications" for communications embed items relating to cable, controls, devices and equipment located on the interior and exterior faces of the precast concrete panels.
16. Division 28 - "Electronic Safety and Security" for embed security items relating to wire, cable and equipment located on the interior and exterior faces of the precast panels.

### 1.3 DEFINITION

- A. Design Reference Sample(s): Sample(s) of approved precast structural concrete color, finish, and texture, pre-approved by Architect and Owner which all fabricators must match.

### 1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design precast structural concrete, including comprehensive engineering analysis by a qualified State of Indiana professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Precast structural concrete units and connections shall withstand design criteria indicated within limits and under conditions indicated.
- C. Structural Performance: Provide precast structural concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:
  1. Dead Loads: See drawings.
  2. Concrete Topping Load: See drawings.
  3. Live Loads: See drawings.
  4. Roof Loads: See drawings.
  5. Snow Loads: See drawings.
  6. Seismic Loads: See drawings.
  7. Wind Loads: See drawings.
  8. Design precast structural concrete framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements. Maintain precast structural concrete deflections within limits of ACI 318.
    - a. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes of minus 18 to plus 120 deg F.
  9. Design Standards: Comply with ACI 318 (ACI 318M) and the design recommendations of PCI MNL 120, "PCI Design Handbook – Precast and Prestressed Concrete".

- a. The precast concrete panels shall be a minimum nominal thickness 4-inches, minimum strength of 5,000 psi and reinforced with minimum W4.0 (MW 26) welded wire fabric at 4-inches on center in both directions conforming to ASTM A185.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.
- C. Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement. Detail fabrication and installation of precast structural concrete units.
  1. Indicate joints, reveals, and extent and location of each surface finish.
  2. Indicate separate face and backup mixture locations and thicknesses.
  3. Indicate welded connections by AWS standard symbols. Show size, length, and type of each weld.
  4. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
  5. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
  6. Include and locate openings larger than by 10-inches.
  7. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
  8. Indicate routing and placement of embed items and openings for conduit, cable, wiring, equipment, controls, devices, light fixtures, etc. within the precast concrete panels in areas designated on the drawings to be concealed. All trades must submit coordinated drawings.
  9. Indicate relationship of precast structural concrete units to adjacent materials.
  10. Indicate estimated camber for precast floor slabs with concrete toppings.
  11. Indicate shim sizes and grouting sequence.
  12. Indicate electrical, security and low voltage devices, boxes and conduit to be embedded in precast concrete.
  13. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- D. Samples:
  1. For each type of finish indicated on exposed surfaces of precast structural concrete units with architectural finish, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 24 by 24 by 2-inches.

- a. Where other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.
- E. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Welding certificates.
- C. Material Certificates: For the following, from manufacturer:
  - 1. Cementitious materials.
  - 2. Reinforcing materials.
  - 3. Admixtures.
  - 4. Bearing pads.
  - 5. Structural-steel shapes and hollow structural sections.
- D. Material Test Reports: For aggregates.
- E. Source quality-control reports.
- F. Field quality-control reports.

## 1.7 QUALITY ASSURANCE

- A. Listed Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Installer Qualifications: A precast concrete erector qualified, as evidenced by PCI's Certificate of Compliance, to erect Category S1 - Simple Structural Systems and Category S2 - Complex Structural Systems.
- C. Installer Qualifications: An experienced precast concrete erector who, before erection of precast concrete, has retained a "PCI-Certified Field Auditor" to conduct a field audit of a project installed by erector in Category S1 - Simple Structural Systems and Category S2 - Complex Structural Systems and who produces an Erectors' Post Audit Declaration, according to PCI MNL 127, "PCI Erector's Manual - Standards and Guidelines for the Erection of Precast Concrete Products."

- D. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- E. Design Standards: Comply with ACI 318 and design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.
- F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."
- G. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D.1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.4, "Structural Welding Code - Reinforcing Steel."
- H. Sample Panels: After sample approval and before fabricating precast structural concrete units with architectural finish, produce a minimum of two (2) sample panels approximately 32 sq. ft. in area for review by Architect. Incorporate full-scale details of all architectural features, finishes, textures, and transitions in sample panels.
  - 1. Locate panels where indicated or, if not indicated, as directed by Architect.
  - 2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes.
  - 3. After approval of repair technique, maintain one sample panel at fabricator's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.
  - 4. Demolish and remove sample panels when directed.
- I. Mockups: After sample panel approval but before production of precast structural concrete units with architectural finish, construct mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups showing all the various precast panel architectural treatments and elements including textures, patterns, colors, window openings and details for both exterior and interior faces. Mockups shall also include anchors, connections, flashings, and joint fillers.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
  - 4. If necessary, the mockup foundation and support frame are to be by others.
- J. Preinstallation Conference: Conduct conference at Project site.



## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Support units during shipment on non-staining shock-absorbing material in same position as during storage.
- B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
  - 1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
  - 2. Place adequate dunnage of even thickness between each unit.
  - 3. Place stored units so identification marks are clearly visible, and units can be inspected.
- C. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage.
- D. Lift and support units only at designated points shown on Shop Drawings.

## 1.9 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.
- B. Embedded Item and Opening Coordination:
  - 1. Identify and locate all embedded items and openings within the panels including but not limited to, receptacles, conduits, wiring, cable, devices, controls, equipment and light fixtures. Coordinate all embedded items and openings with the various trades as required in all the areas designated on the drawings to be concealed.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Fabricators: Subject to compliance with requirements, available fabricators offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. ATMI Precast.
  - 2. Coreslab Structures, Inc.
  - 3. Fabcon Precast.
  - 4. Gate Precast Company.
  - 5. High Concrete Group, LLC.
  - 6. International Precast Solutions, LLC.
  - 7. Kerkstra Precast, Inc.

## 2.2 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
  - 1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.
- B. Multi-use, Acrylonitrile-Butadiene Styrene (ABS) Plastic Form Liners: Low use (2-5) units of face design, texture, arrangement, and configuration indicated. Furnish with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide "408 Bush Hammer" by Architectural Polymers or a comparable product by the following:
    - a. Fitzgerald Formliners. #17998 Bush Hammer.
    - b. CustomRock Formliner. #2510 Bush Hammer.
  - 2. Formliner Description:
    - a. Material: ABS Plastic (2-5) reuses.
    - b. Texture: 1/4-inch medium texture.
    - c. Maximum Depth: 1/4 to 3/8-inch.

## 2.3 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from wire into flat sheets.
- E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

## 2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III, white or gray, unless otherwise indicated below.
  - 1. For exterior wythe on exterior walls or use white cement with white silica sand, of same type, brand, and mill source.
  - 2. For the interior wythe on exterior walls and both sides of all interior walls use gray cement.
- B. Supplementary Cementitious Materials:
  - 1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
  - 2. Metakaolin Admixture: ASTM C 618, Class N.
  - 3. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
  - 4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
- D. Lightweight Aggregates: Except as modified by PCI MNL 116, ASTM C 330, with absorption less than 11 percent.
- E. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.
- F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.
- G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- H. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
  - 1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
  - 5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M.
- I. Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

## 2.5 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.
- B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.
- C. Carbon-Steel Plate: ASTM A 283/A 283M.
- D. Malleable-Iron Castings: ASTM A 47/A 47M.
- E. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.
- F. High-Strength, Low-Alloy Structural Steel: ASTM A 572/A 572M.
- G. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.
- H. Wrought Carbon-Steel Bars: ASTM A 675/A 675M, Grade 65.
- I. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.
- J. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.
- K. High-Strength Bolts and Nuts: ASTM A 325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.
  - 1. Do not zinc coat ASTM A 490 bolts.
- L. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M.
  - 1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
  - 2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20.
- M. Shop-Primed Finish: Prepare surfaces of nongalvanized-steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3, and shop apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 according to SSPC-PA 1.
- N. Welding Electrodes: Comply with AWS standards.
- O. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install precast structural concrete units.

## 2.6 BEARING PADS

- A. Provide one of the following bearing pads for precast structural concrete units as recommended by precast fabricator for application:
1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 60 to 70 Shore, Type A durometer hardness, ASTM D 2240; minimum tensile strength 2250 psi, ASTM D 412.
  2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. 70 to 90 Shore, Type A durometer hardness, ASTM D 2240; capable of supporting a compressive stress of 3000 psi with no cracking, splitting, or delaminating in the internal portions of pad. Test 1 specimen for every 200 pads used in Project.
  3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer; 80 to 100 Shore, Type A durometer hardness, ASTM D 2240; complying with AASHTO's "AASHTO Load and Resistance Factor Design (LRFD) Bridge Specifications," Division II, Section 18.10.2; or with MIL-C-882E.
  4. Frictionless Pads: Tetrafluoroethylene, glass-fiber reinforced, bonded to stainless- or mild-steel plate, of type required for in-service stress.
  5. High-Density Plastic: Multi-monomer, non-leaching, plastic strip.

## 2.7 GROUT MATERIALS

- A. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time.

## 2.8 INSULATED FLAT WALL PANEL ACCESSORIES

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. ft. square edges; with R-value of 20 and thickness of 4-inches.
1. Maximum flame-spread and smoke developed indexes of 75 and 450 respectively per ASTM E 84.
- B. Wythe Connectors: Non-conductive type metal connectors-conductive types are prohibited.
1. Basis-of-Design Types: Provide low-conductivity connectors from one of the following:
    - a. HK Composites.
    - b. Thermomass Connector System.

## 2.9 CONCRETE MIXTURES

- A. Basis-of-Design Control Panel Sample: Subject to compliance with requirements provide 'Mix #69" as manufactured by Coreslab Structures or a comparable product approved by Architect for all exterior wall faces.
  - 1. Composition:
    - a. Coarse Aggregate: MM #9 Limestone.
    - b. Fine Aggregate: MM #23 River Sand.
    - c. Cement: White.
    - d. Coloring: BASF liquid, 20.0Y, 4.0 BL, 3.0 LR.
    - e. Finish: Light Acid Etch
- B. Prepare design mixtures for each type of precast concrete required.
  - 1. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.
  - 2. Limit use of fly ash to 25 percent replacement of Portland cement by weight and granulated blast-furnace slag to 40 percent of Portland cement by weight; metakaolin and silica fume to 10 percent of Portland cement by weight.
- C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.
- D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.
- E. Normal-Weight Concrete Mixtures: Proportion face mixtures or face and backup mixtures or full-depth mixture or face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 5000 psi
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 116.
- G. Lightweight Concrete Backup Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.2, with materials to be used on Project, to provide lightweight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 5000 psi
  - 2. Unit Weight: Calculated equilibrium unit weight of 115 lb/cu. ft., plus or minus 3 lb/cu. ft., according to ASTM C 567.

- H. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.
- I. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.
- J. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

## 2.10 MOLD FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pre-stressing and de-tensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.
  - 1. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concrete placement. Coat form liner with form-release agent.
- B. Maintain molds to provide completed precast structural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
  - 1. Form joints are not permitted on faces exposed to view in the finished work.
  - 2. Edge and Corner Treatment: Uniformly chamfered.

## 2.11 FABRICATION

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
  - 1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.
- C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.

- D. Cast-in openings larger than 10-inches in any dimension. Do not drill or cut openings or reinforcement bars without Architect's approval.
- E. Cast-in electrical, security and communication services conduit and receptacles in areas as indicated on the drawings where surface-mount conduit, devices, controls and receptacles are not acceptable. Surface mounted, exposed conduit and plumbing is not acceptable on the building exterior. Conduit and receptacles are to be provided to the precast fabricator. Refer to electrical, communications, electronic safety and security drawings for conduit and receptacle locations in these areas.
- F. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.
  - 1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcement exceeds limits specified, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
  - 2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
  - 3. Place reinforcement to maintain at least 3/4-inch minimum coverage. Increase cover requirements according to ACI 318 when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
  - 4. Place reinforcing steel and pre-stressing strand to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
  - 5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- G. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses.
- H. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.
- I. Place face mixture to a minimum thickness after consolidation of the greater of 1-inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- J. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.
  - 1. Place backup concrete mixture to ensure bond with face-mixture concrete.



- K. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 116.
  - 1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."
- L. Comply with ACI 306.1 procedures for cold-weather concrete placement.
- M. Comply with PCI MNL 116 procedures for hot-weather concrete placement.
- N. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that will not show in finished structure.
- O. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- P. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Architect's approval.
- Q. Panel Composition: Panels will be a 12-inches total thickness comprised as follows:
  - 1. Interior Wythe: Minimum 5-inches solid concrete with minimum strength of 5,000 psi W4 (MW26) welded wire fabric at 4-inches o.c. both directions. Conforming to ASTM A185 and noted as Security walls on the drawings. Steel Trowel finish on exposed face.
  - 2. Insulation: Minimum 4-inches Extruded Polystyrene (R 5 per inch, R 20 total)
  - 3. Exterior Wythe: Minimum 3-inches reinforced concrete with the mix ingredients per section 2.10 "Concrete Mixtures" A.1
- R. Panel Details:
  - 1. Outside Corners: 1-1/2-inch quirk miter joint.
  - 2. Inside Corners: Butt joint.
  - 3. Panel Returns: Smooth.

## 2.12 CASTING INSULATED WALL PANELS

- A. Cast and screed wythe supported by mold.
- B. Place insulation boards abutting edges and ends of adjacent boards. Insert wythe connectors through insulation, and consolidate concrete around connectors according to connector manufacturer's written instructions.

- C. Cast and screed top wythe to meet required finish.

## 2.13 FABRICATION TOLERANCES

- A. Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product dimension tolerances.

## 2.14 INTERIOR FINISHES

- A. Finish exposed back surfaces of architectural precast concrete units with smooth, two-pass steel-trowel finish.

## 2.15 ARCHITECTURAL FINISHES

- A. Manufacture member faces free of joint marks, grain, and other obvious defects with corners, including false joints, uniform, straight, and sharp. Finish exposed-face surfaces of precast concrete units to match approved design reference sample and as follows:
  - 1. Textured-Surface Finish: Impart by form liners or inserts to provide surfaces free of pockets, streaks, and honeycombs, with uniform color and texture.
  - 2. Acid-Etched Finish Main Body: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attack.
  - 3. Provide two-sided finishes at exposed perimeter wall surfaces:
    - a. Outside Finish: Acid etched with and without formliner finishes as indicated per section 2.2 "Mold Finishes" B.1.
    - b. Inside Finish: Two-pass, steel troweled finish for painting.
  - 4. Provide two-sided finishes at exposed interior wall surfaces.
    - a. One Side Finish: Two-pass, steel troweled finish for painting.
    - b. Other Side Finish: Smooth-form finish for painting.

## 2.16 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate precast structural concrete fabricator's quality-control and testing methods.
  - 1. Allow testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.
- B. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements.

1. Test and inspect self-consolidating concrete according to PCI TR-6.
- C. Strength of precast structural concrete units will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.
- D. If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, employ a qualified testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.
1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
  2. Cores will be tested in an air-dry condition or, if units will be wet under service conditions, test cores after immersion in water in a wet condition.
  3. Strength of concrete for each series of three cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
  4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:
    - a. Project identification name and number.
    - b. Date when tests were performed.
    - c. Name of precast concrete fabricator.
    - d. Name of concrete testing agency.
    - e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- E. Patching: If core test results are satisfactory and precast structural concrete units comply with requirements, clean and dampen core holes and solidly fill with same precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces per manufacturer's standard.
- F. Defective Units: Discard and replace exposed finish precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Do not install precast concrete units until supporting, cast-in-place, building structural framing has attained minimum allowable design compressive strength or until supporting steel or other structure is complete.

## 3.2 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.
- B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, supports, and bracing as required to maintain position, stability, and alignment of units until permanent connection.
  - 1. Install temporary steel or plastic spacing shims or bearing pads as precast structural concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
  - 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
  - 3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
  - 4. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.
- C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
  - 1. Do not permit connections to disrupt continuity of roof flashing.
- D. Field cutting of precast units is not permitted without approval of the Architect.
- E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.
- F. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

1. Protect precast structural concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
  2. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil-thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780.
  3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
  4. Remove, reweld, or repair incomplete and defective welds.
- G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.
1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot. For friction connections, apply specified bolt torque and check 25 percent of bolts at random by calibrated torque wrench.
- H. Grouting: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled.
1. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces.
  2. Fill joints completely without seepage to other surfaces.
  3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
  4. Place grout end cap or dam in voids at ends of hollow-core slabs.
  5. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
  6. Keep grouted joints damp for not less than 24 hours after initial set.

### 3.3 ERECTION TOLERANCES

- A. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.
- B. Erect architectural precast structural concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.
- C. Erect architectural precast concrete units level, plumb, square, and in alignment, without exceeding the following noncumulative erection tolerances:
1. Plan Location from Building Grid Datum: Plus or minus 1/2-inch.
  2. Plan Location from Centerline of Steel: Plus or minus 1/2-inch.
  3. Top Elevation from Nominal Top Elevation: As follows:
    - a. Exposed Individual Panel: Plus or minus 1/4-inch.
    - b. Non-Exposed Individual Panel: Plus or minus 1/2-inch.
    - c. Exposed Panel Relative to Adjacent Panel: 1/4-inch.

- d. Non-Exposed Panel Relative to Adjacent Panel: 1/2-inch.
- 4. Support Elevation from Nominal Support Elevation: As follows:
  - a. Maximum Low: 1/2-inch.
  - b. Maximum High: 1/4-inch.
- 5. Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet: 1-inch.
- 6. Plumb in Any 10 Feet of Element Height: 1/4-inch.
- 7. Maximum Jog in Alignment of Matching Edges: 1/4-inch.
- 8. Joint Width (Governs over Joint Taper): Plus or minus 1/4-inch.
- 9. Maximum Joint Taper: 3/8-inch.
- 10. Joint Taper in 10 Feet: 1/4-inch.
- 11. Maximum Jog in Alignment of Matching Faces: 1/4-inch.
- 12. Differential Bowing or Camber, as Erected, between Adjacent Members of Same Design: 1/4-inch.
- 13. Opening Height between panels: Plus or minus 1/4-inch.

### 3.4 FIELD QUALITY CONTROL

- A. Special Inspections: The Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. Erection of load bearing precast concrete members.
- B. Testing Agency: The Owner will engage a qualified testing agency to perform tests and inspections.
- C. Field welds will be visually inspected and nondestructive tested according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.
- D. Testing agency will report test results promptly and in writing to Contractor and Architect.
- E. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- G. Prepare test and inspection reports.

### 3.5 REPAIRS

- A. Repair precast structural concrete units if permitted by Architect.
  - 1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units has not been impaired.

- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet. Architect will determine final acceptance of panel repair.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.
- D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.
- E. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

### 3.6 CLEANING

- A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
  - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
  - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100

## SECTION 034130 - PRECAST PRESTRESSED HOLLOWCORE SLAB UNITS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes:
  - 1. Providing openings in units to accommodate the work under this and other Sections and building into the units such as sleeves, anchor bolts and inserts required to be embedded in the units under this and other sections.
  - 2. Notify other disciplines in advance of the precasting to provide them with sufficient time to advise of item required in their work that must be installed in the units.
- B. Furnish all labor, materials, equipment and incidentals required to provide precast prestressed hollow slab units as shown and specified.
- C. Related Sections:
  - 1. Section 033000 - "Cast-in-Place Concrete" for concrete topping and placing connection anchors in concrete.
  - 2. Section 051200 - "Structural Steel Framing" for furnishing and installing connections attached to structural-steel framing.
  - 3. Section 055000 - "Metal Fabrications" for kickers and other miscellaneous steel shapes.
  - 4. Section 078443 "Joint Firestopping" for firestopping vertical joints between fire-rated precast structural concrete wall panels.
  - 5. Section 079200 - "Joint Sealants" for elastomeric joint sealants and sealant backings.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Design: Design units to support the superimposed loads shown or specified, in addition to the dead weight load of the units and construction loads (including piping and equipment loading, and structural topping loading), in accordance with the 2014 Indiana Building Code.

## 1.4 SUBMITTALS

- A. Shop Drawings:



1. Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement.
  2. Detail fabrication and installation of precast structural concrete units, including connections at member ends and to adjoining construction.
  3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
  4. Indicate separate face and backup mixture locations and thicknesses.
  5. Indicate type, size, and length of welded connections by AWS standard symbols.
  6. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
  7. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
  8. Include and locate openings larger than 10-inches. Where additional structural support is required, include header design.
  9. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
  10. Indicate relationship of precast structural concrete units to adjacent materials.
  11. Indicate locations, dimensions, and details of thin-brick units, including corner units and special shapes, and joint treatment.
  12. Indicate locations, dimensions, and details of stone facings, anchors, and joint widths.
  13. Indicate estimated camber for precast floor slabs with concrete toppings.
  14. Indicate shim sizes and grouting sequence.
  15. If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- B. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Show precast structural concrete unit types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from precast structural concrete.
- C. Product Data:
1. Manufacturer's standard and special loading chart data for span and loading conditions required.
  2. Submit certificates of material conformance with Specifications.
  3. Submit manufacturer's literature and installation instructions.
- D. Quality Assurance/Control Submittals:
1. Test Reports: Submit copies of all concrete cylinder test reports.

2. Certification Program: Manufacturer to participate in and furnish evidence to the OWNER of plant certification program specified in PCI MNL-116.
3. Manufacturer's Instructions: Submit all conditions at openings, including size, location, topping and grout details, fasteners, and header locations and dimensions.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
  1. Designated as a PCI-certified plant as follows:
    - a. Group C, Category C2 – Prestressed Hollowcore and Repetitively Produced Products.
  2. Installer Qualifications: A precast concrete erector qualified and designated by PCI's Certificate of Compliance, to erect Category S1 – Simple Structural Systems.
- B. Regulatory Requirements:
  1. Comply with ACI 318, PCI MNL 116, and PCI Design Handbook.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with the following:
  1. Transport and handle precast concrete slabs with proper equipment to protect units from dirt and damage.
  2. Handle by means of lifting inserts, or slings.
  3. Store units off ground and on firm surfaces to avoid warping and cracking.
  4. Protect units from damage and discoloration.
  5. Stack so that lifting devices are accessible and undamaged.
  6. Separate stacked members by battens across full width.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Provide one the following:
  1. Flexicore Company, Inc.
  2. Hollowcore Midwest, LLC
  3. Fabcon Precast
  4. Gate Precast Concrete

5. High Concrete Group, LLC
6. Kerkstra Precast, Inc.
7. Coreslab Structures, Inc.
8. ATMI Precast
9. International Precast Solutions, LLC
10. Or approved equal.

## 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from wire into flat sheets.
  1. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
  2. Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

## 2.3 CONCRETE MATERIALS

- A. Concrete:
- B. Portland Cement: Conform to ASTM C150, Type III.
- C. Aggregate: Conform to ASTM C33, for fine to coarse gradation.
- D. Chemical Admixtures:
  1. Comply with: ASTM C494.
  2. Calcium chloride shall not be used.
- E. Water: Free from foreign materials in amount harmful to concrete.

## 2.4 PRESTRESSING STRANDS

- A. Uncoated, 7-wire, low-relaxation strands conforming to ASTM A416, Grade 250 or 270.

## 2.5 BEARING PADS

- A. Non-staining pressed (60 or 70 Durometer hardness) neoprene with thickness as indicated on Drawings of plastic with a compressive strength of 8,000 psi minimum, and negligible cold flow characteristics.

## 2.6 WELD INSERTS

- A. Weld inserts, anchors, and anchor plates: To remain as shown and as required for anchoring slabs to supports.

## 2.7 HEADERS

- A. Required to safely carry design loads.
- B. Fabricated of steel conforming to ASTM A36.
- C. Galvanized as specified in Section 055000 "Metal Fabrications".

## 2.8 CONCRETE MIXES

- A. Mix Design: In accordance with ACI 211.3 or ACI 211.1, 5000 psi concrete at 28 days.
- B. Measurements of concrete mix materials shall be within the following limits:
  - 1. Cement: +/- 1%
  - 2. Water: +/- 1%
  - 3. Fine aggregate: +/- 2%
  - 4. Coarse Aggregate: +/- 2%
  - 5. Admixtures: +/- 3%

## 2.9 FABRICATION

- A. Shop Assembly:
  - 1. Type: Machine made, precast prestressed concrete units with open voids running the full length of slabs, produced under a rigid factory-inspected process acceptable to the ARCHITECT.
  - 2. Furnish units, which are free of voids and honeycomb, with straight true edges and surfaces.
    - a. Provide units of a uniform color and free from stains or discoloration.
    - b. Top surface to have a float finish or machine finish free from holes if no structural topping is to be applied, and broom finish if structural topping is to be applied.

3. Pretension prestressing strands by either a dead weight system or a single strand jacking system.
  - a. Mark strands for slippage, and if slippage occurs, detention and restress strand.
  - b. Check tension of strand to insure accurate results.
4. Release strands when concrete reaches a minimum strength of 3,000 psi, or greater as required by design.
5. Adequately reinforce slab units to resist all transporting and handling stresses.
6. Include cast-in weld plates where required for anchorage or lateral bracing to structural steel members.
7. Identifications:
  - a. Provide permanent markings as shown on the Shop Drawings.
  - b. Markings not to show in the finished work.
8. Provide solid, monolithic precast slab units where shown to be an integral part of hollow slab unit system. Design and fabricate solid units to the dimensions and details shown, and as specified for hollow slab units.
9. Provide headers of structural steel shapes for openings larger than one slab width in accordance with hollow slab unit manufacturer's recommendations.
10. Units may be wet or steam cured at atmospheric pressure. If steam cured, conform to the requirements of ACI 517.2R.

## 2.10 FABRICATION TOLERANCES

- A. Fabricate units to comply with the following tolerances:

1. Length:  $\pm 1/2$ - inch
2. Width:  $\pm 1/4$ -inch
3. Depth:  $\pm 1/4$ -inch
4. Position of weld plates:  $\pm 1/2$ -inch

## 2.11 INTERIOR FINISHES

- A. Finish exposed back surfaces of architectural precast concrete units with smooth, two-pass steel-trowel finish.

## 2.12 SOURCE QUALITY CONTROL

- A. Tests: Make cylinder tests of concrete quality in accordance with ASTM C192, for each mix design, for each day of production, or for each 100 cubic yards of concrete.

## PART 3- EXECUTION

## 3.1 EXAMINATION

## A. Site Verification of Conditions:

1. Examine the areas and conditions under which hollow slab units are to be installed.
2. Notify the CONSTRUCTION MANAGER in writing of conditions detrimental to the proper and timely completion of the work.
3. Do not proceed with the work until unsatisfactory conditions have been corrected.

## B. Units not meeting the fabrication requirements, having any dimension smaller or greater than required, or that are outside the specified tolerance limits, will be rejected if the appearance, function, or structural integrity of the structure is adversely affected.

## 3.2 INSTALLATION

## A. Lift, place, and secure hollow slab units in accordance with manufacturer's printed instructions and reviewed Shop Drawings.

## B. Keep units tight and perpendicular to bearing supports.

## C. Do not install hollow slab units until supporting members are in place and secured.

## D. If any units rest on masonry block lintels, assure that voids in lintels are filled with concrete.

## E. Follow erection procedures and sequence of erection as recommended by hollow slab unit manufacturer.

## F. Differential camber between adjacent members of the same design, 1/4-inch per 10 feet but not greater than 1/2-inch over the total length.

## G. Level slabs accurately or set to uniform slope as shown:

## 1. Bearing Surface:

- a. Use bearing pads where units set on masonry.
- b. Set slabs on solid, level bearings, with bearing surface of slab units not less than 3-inches at steel supports and not less than 4-inches at other supports unless otherwise acceptable to the CONSTRUCTION MANAGER.

## 2. Align and level to approved tolerance by methods, procedures, and equipment as recommended by the hollow slab unit manufacturer.

## 3. Vertical Alignment:

- a. Where adjacent units are not in vertical alignment due to camber or other reason, provide mortar fill on lower unit to create a smooth transitional surface for the application of insulation.
- b. Slope of fill, measured perpendicular to side joints, shall not be steeper than 1/8-inch per foot.

H. Cutting Holes:

- 1. Do not cut holes or install sleeves larger than size permitted by hollow slab unit manufacturer for pipe, conduits, duct or other penetrations after fabrication, except as otherwise shown or specified.
- 2. Do not cut reinforcing or pre-stressing strands without approval of manufacturer and as acceptable to the CONSTRUCTION MANAGER.
- 3. Field cut holes for openings that do not disturb pre-stressing strands in accordance with hollow slab unit manufacturer's instructions, unless otherwise shown or specified.

I. Weld inserts in slab units to bearing surfaces, as shown and specified.

J. Grouting Joints:

- 1. Clean joints before grouting.
- 2. Grout: One-part Portland cement to 2 1/2-parts sand.
- 3. Fill joints between units with grout.
- 4. Remove grout that seeped through to ceiling below before grout hardens to allow for caulking.

K. Caulk ceiling joints per Section 079200 "Joint Sealants".

3.3 REPAIR/RESTORATION

- A. Repair damaged exposed surfaces. Leave units in a condition acceptable to the CONSTRUCTION MANAGER and ready to receive subsequent work.

END OF SECTION 034130

## SECTION 042113 - BRICK MASONRY

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

1. Face brick.
2. Thin-set brick veneer.
3. Mortar.
4. Ties and anchors.
5. Embedded flashing.
6. Miscellaneous masonry accessories.

- B. Related Sections:

1. Section 034100 – “Precast Structural Concrete” for thin brick veneer cast in precast concrete panels.
2. Section 055000 - "Metal Fabrications" for furnishing steel lintels and for brick masonry.

## 1.3 SUBMITTALS

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

- B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

- C. Samples for Verification: For each type and color of the following:

1. Face brick, in the form of straps of five or more bricks.
2. Weep holes and vents.
3. Accessories embedded in masonry.

- D. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.



1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- E. Material Certificates: For each type and size of the following:
1. Masonry units.
    - a. Include data on material properties.
    - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
  2. Cementitious materials. Include brand, type, and name of manufacturer.
  3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  4. Anchors, ties, and metal accessories.
- F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
- G. Minutes from Pre-installation Conference.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- D. Mockups: Build mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for material and execution.
1. Build sample panels exposed brick masonry construction, stone band and both sizes and finishes of stone masonry in a panel size approximately 54-inches long by 60-inches high by full thickness, including face and backup wall construction and accessories.
  2. Include through-wall flashing.
  3. Include veneer anchors, insulation, flashing, cavity drainage material, and weep holes in exterior masonry- veneer wall mockup.
  4. Include CMU's on interior face of mockup.
  5. Include a sealant-filled joint at least 60-inches long in mockup.
  6. Clean exposed faces of panels with masonry cleaner indicated.

7. Protect approved sample panels from the elements with weather-resistant membrane.
8. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
  - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
9. Clean exposed faces of mockups with masonry cleaner as indicated.
10. Protect accepted mockups from the elements with weather-resistant membrane.
11. Approved mockups may not become part of the completed.

- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Section 013113- "Project Coordination."

#### 1.5 DELIVERY, STORAGE, AND HANDLING

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

#### 1.6 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24-inches down both sides of walls and hold cover securely in place.

2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24-inches down face next to unconstructed wythe and hold cover in place.
- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## PART 2 - PRODUCTS

### 2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

### 2.2 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  3. Provide special shapes for soldier course at corners.
- B. Face Brick Color A: Field facing brick complying with ASTM C 216.
1. Basis-of Design Product: Subject to compliance with requirements, provide "Coppertone Velour" as manufactured by Sioux City Brick or a comparable product by the following:
    - a. Endicott Clay Products.
    - b. Glen-Gery Brick
    - c. Interstate brick.
    - d. The Belden Brick Company.
  2. Size: Modular.
  3. Grade: SW.
  4. Type: FBX.
  5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
  6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
  7. Full Unit Size (Actual Dimensions): 3-5/8-inches wide by 3-5/8-nches high by 7-5/8-inches long.
  8. Thin-Set Unit Size: Size (Actual Dimensions): 3/4-inches wide by 3-5/8-nches high by 7-5/8- inches long.
- C. Face Brick Color B: Field facing brick complying with ASTM C 216.
1. Basis-of Design Product: Subject to compliance with requirements, provide "Sienna Ironspt Velour" as manufactured by Endicott Clay Products or a comparable product by the following:
    - a. Glen-Gery Brick
    - b. Interstate brick.
    - c. Sioux City Brick
    - d. The Belden Brick Company.
  2. Size: Modular.
  3. Grade: SW.
  4. Type: FBX.
  5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
  6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
  7. Size (Actual Dimensions): 3-5/8-inches wide by 3-5/8-nches high by 7-5/8- inches long.

8. Thin-Set Unit Size: Size (Actual Dimensions): 3/4-inches wide by 3-5/8-inches high by 7-5/8-inches long.

## 2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color as required to produce mortar color to match existing.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144.
  1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
- D. Cold-Weather Admixture: No cold-weather admixtures shall be used.
- E. Water: Potable.

## 2.4 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with 042200 – "Concrete Unit Masonry".

## 2.5 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual and Section 076200 - "Sheet Metal Flashing and Trim" and as follows:
  1. Stainless-Steel: ASTM A 240/A 240M, Type 304, 0.016-inch thick.
  2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216-inch thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162-inch thick.
  3. Fabricate continuous flashings in sections 96-inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  4. Fabricate through-wall metal flashing embedded in masonry from stainless-steel or copper, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Cheney Flashing Company; Cheney Flashing (Dovetail) or Cheney 3-Way Flashing (Sawtooth).
      - 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thru-wall Flashing.

5. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2-inch out from wall, with outer edge bent down 30 degrees and hemmed.
  6. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3-inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
  7. Metal Drip Edge: Fabricate from stainless-steel. Extend at least 3-inches into wall and 1/2-inch out from wall, with outer edge bent down 30 degrees and hemmed.
  8. Metal Expansion-Joint Strips: Fabricate from stainless-steel to shapes indicated.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Copper Fabric Flashing or Copper Sealtite 2000.
      - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
      - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
      - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
      - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
      - 6) York Manufacturing, Inc.; Multi-Flash 500.
  2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Cop-R-Cote.
      - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Coated Thru-Wall Flashing.
      - 3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
      - 4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
      - 5) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
- C. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
  2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
  3. Where flashing is fully concealed, use flexible flashing.
- D. Solder and Sealants for Sheet Metal Flashings:

1. Solder for Stainless-steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
  3. Elastomeric Sealant: ASTM C 920, chemically curing urethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- B. Weep/Vent Products: Use one of the following unless otherwise indicated:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height 3-5/8-inches and width of head joint and depth 1/8-inch less than depth of outer wythe, in color selected from manufacturer's standard.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
      - 2) Heckmann Building Products Inc.; No. 85 Cell Vent.
      - 3) Hohmann & Barnard, Inc.; Quadro-Vent.
- C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Advanced Building Products Inc.; Mortar Break or Mortar Break II.
    - b. Archovations, Inc.; CavClear Masonry Mat.
    - c. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
    - d. Mortar Net USA, Ltd.; Mortar Net.
  2. Provide one of the following configurations:
    - a. Strips, full-depth of cavity and 10-inches high, with dovetail shaped notches 7-inches deep that prevent clogging with mortar droppings.
    - b. Strips, not less than 1-1/2-inches thick and 10-inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

## 2.7 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Diedrich Technologies, Inc.
    - b. EaCo Chem, Inc.
    - c. ProSoCo, Inc.

## 2.8 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar.
  - 2. Use Portland cement-lime mortar unless otherwise indicated.
  - 3. No cold-weather admixtures allowed.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide Type S for exterior Brick construction.
  - 1. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  - 2. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Face brick.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.2 INSTALLATION, GENERAL

- A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.
- D. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

### 3.3 TOLERANCES

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

## C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8-inch with a maximum thickness limited to 1/2-inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8-inch.
2. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8-inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8-inch.

## 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond with rowlock (header) and soldier bands, as indicated on Drawings; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs. Soldier corners are a special shape.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

## 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick as follows:
  1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  2. With entire units, including areas under cells, fully bedded in mortar at starting course on footings.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  2. Allow cleaned surfaces to dry before setting.
  3. Wet joint surfaces thoroughly before applying mortar.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### 3.6 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to masonry-veneer anchors to comply with the following requirements:
1. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  2. Space anchors as indicated, but not more than 16-inches o.c. vertically and 24-inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12-inches of openings and at intervals, not exceeding 36-inches, around perimeter.

### 3.7 EXPANSION JOINTS

- A. General: Install expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form expansion joints in brick as follows:
1. Build flanges of metal expansion strips into masonry. Lap each joint 4-inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
  2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8-inch for installation of sealant and backer rod specified in Section 079200 - "Joint Sealants."
- C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8-inch.

### 3.8 LINTELS

- A. Install galvanized steel lintels as indicated.
- B. Provide minimum bearing of 8-inches at each jamb unless otherwise indicated.

### 3.9 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8-inches, with upper edge tucked under building paper or building wrap, lapping at least 4-inches.
  - 3. At lintels and shelf angles, extend flashing a minimum of 6-inches to masonry at each end. At heads and sills, extend flashing 6-inches at ends and turn up not less than 2-inches to form end dams.
  - 4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2-inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section - "Joint Sealants" for application indicated.
  - 5. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 - "Joint Sealants" for application indicated.
  - 6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2-inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
  - 7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2-inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
  - 1. Use specified weep/vent products to form weep holes.
  - 2. Space weep holes 24-inches unless otherwise indicated.
  - 3. Trim wicking material flush with outside face of wall after mortar has set.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

### 3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 2 special inspections according to the "International Building Code."
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
- C. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

### 3.11 REPAIRING, POINTING, AND CLEANING

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

### 3.12 MASONRY WASTE DISPOSAL

- A. Excess whole bricks shall become property of Owner. At completion of unit masonry work, store as directed on Owner's site.

END OF SECTION 042113

## SECTION 042200 – CONCRETE UNIT MASONRY

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes:

1. Concrete masonry units.
2. Decorative scored masonry units.
3. Decorative ground-face masonry units.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry joint reinforcement.
7. Ties and anchors.
8. Miscellaneous masonry accessories.

## B. Related Sections:

1. Section 042113 "Brick Masonry" for furnishing brick masonry construction.
2. Section 055000 "Metal Fabrications" for furnishing galvanized steel lintels for unit masonry.
3. Section 102813.63 "Detention Toilet Accessories" for anchors required to be set into grouted masonry.

## C. Products installed, but not furnished, under this Section include the following:

1. Steel lintels and shelf angles for unit masonry, furnished under Section 055000 "Metal Fabrications."

## 1.3 DEFINITIONS

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

## 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site

### 1.5 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
  - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

### 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
  - 3. Accessories embedded in masonry.
- C. Samples for Verification: For each type and color of the following:
  - 1. Colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

### 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
  - 1. Masonry units.
    - a. Include material and strength test reports substantiating compliance with requirements. Test results must be obtained from samples which utilize same materials supplied for this project. Test results must not be older than 6 months prior to contractors Notice to Proceed.
    - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
  - 2. Cementitious materials. Include brand, type, and name of manufacturer.
  - 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  - 4. Grout mixes. Include description of type and proportions of ingredients.
  - 5. Reinforcing bars.
  - 6. Joint reinforcement.

7. Anchors, ties, and metal accessories.
- C. Cavity Wall Insulation/Air Barrier/Moisture Intrusion System:
  1. Certificate of Compliance with ASTM E 2357 and ASTM E 331.
- D. Insulation System Thermal Performance Warranty:
  1. Duration: Fifty (50) years.
- E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
  2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- F. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- G. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

## 1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Build mockup of typical wall area as required by Section 042113 "Brick Masonry". Include each type of masonry unit, including CMU's, used on project.



2. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
  - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
  - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
3. Approved mockups may not remain as part of the completed Work.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

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

#### 1.10 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24-inches down both sides of walls and hold cover securely in place.
  2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24-inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## PART 2 - PRODUCTS

### 2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
  - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

## 2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
  2. Density Classification: Normal weight.
  3. Size (Width): Manufactured to dimensions 3/8-inch less than nominal dimensions.
- C. Decorative Scored CMUs: ASTM C90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
  2. Density Classification: Normal weight.
  3. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
  4. Pattern and Texture:
    - a. Scored vertically so units laid in a quarter running bond appear as one-half running bond, standard finish.
- D. Decorative Ground Face CMUs: ASTM C90.
1. Basis of Design Product: Subject to compliance with requirements provide "Burnished Masonry Units" as manufactured by Grand Blanc Cement Products or a comparable product.
  3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
  4. Density Classification: Normal weight.
  5. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
  6. Pattern and Texture:
    - a. Scored vertically so units laid in a quarter running bond appear as one-half running bond, standard finish.
  7. Colors: As selected by Architect from manufacturer's full range.

## 2.4 MASONRY LINTELS

- A. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.

## 2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
  - 2. Private-labeled products shall utilize one of acceptable manufacturers listed below.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- D. Mortar Cement: ASTM C 1329/C 1329M.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Capital materials Corp.
    - b. Cemex.
    - c. Essroc.
    - d. Holcim (US), Inc.
    - e. Lafarge North America, Inc.
    - f. Lehigh Cement Co, Inc.
    - g. National Cement Co., Inc.
    - h. Private-labeled product that utilizes cement manufactured by one of listed manufacturers above.
- E. Aggregate for Mortar: ASTM C 144.
- F. Aggregate for Grout: ASTM C 404.
  - 1. Fine Aggregate: Gradation in accordance with INDOT No. 23.
  - 2. Course Aggregate: One hundred percent of the course aggregate shall pass the 1/2 in. sieve and no more than 5% shall pass the No. 30 sieve.
- G. Cold-Weather Admixture: No cold-weather admixtures shall be used.
- H. Water: Potable.

## 2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Heckmann Building Products, Inc.; No. 376 Rebar Positioner.
  2. Hohman & Barnard, Inc.; RB Rebar Positioners, RB-Twin Rebar Positioners.
  3. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- C. Masonry Joint Reinforcement, General: Ladder or Truss joint reinforcement confirming to ASTM A 951.
1. Interior Walls: Hot-dip galvanized, carbon steel.
  2. Exterior Walls: Hot-dip galvanized, carbon steel.
  3. Wire Size for Side Rods: 0.187-inch diameter.
  4. Wire Size for Cross Rods: 0.187-inch diameter.
  5. Wire Size for Veneer Ties: 0.187-inch diameter.
  6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16-inches o.c.
  7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.
- E. Masonry-Joint Reinforcement for Interior and Screen Wall Multi-Wythe Masonry:
1. Ladder type with one side rod at each face shell of hollow masonry units more than 4-inches wide, plus two side rods at each wythe of masonry 4-inches wide or less.
  2. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle and eye connections having a maximum horizontal play of 1/16-inch and maximum vertical adjustment of 1-1/4-inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

## 2.7 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2-inches into masonry but with at least a 5/8 cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
  2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, with ASTM A 153, Class B coating.
  3. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2-inches parallel to face of veneer.
- D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4-inches.
  2. Wire: Fabricate from 3/16-inch-diameter, hot-dip galvanized steel wire.
- E. Partition Top Anchors: 0.105-inch- thick metal plate with a 3/8-inch-diameter metal rod 6 inches (long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
1. Eliminate the top CMU course edge bullnose for a closed plate connection minimizing the gaps between the CMU and steel plate.
- F. Rigid Anchors (Load Bearing CMU to Load Bearing CMU): Fabricate from steel bars 1-1/2-inches wide by 1/4-inch thick by 24-inches long, with ends turned up 2-inches or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.
- G. Adjustable Thermal Masonry-Veneer Anchors to Cold-Formed Steel Studs:
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment through sheathing to steel studs, and as follows:
    - a. Products:
      - 1) Hohmann & Barnard, Inc.; Veneer Anchor, 2-Seal Wing Nut Tie.
      - 2) Heckmann Building Products, Inc.; Pos-I-Tie.
    2. Wire Ties: Manufacturer's standard galvanized wire tie for product fabricated from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.
    3. Corrosion Protection: Hot-dip galvanize after fabrication.

## 2.8 EMBEDDED FLASHING MATERIALS

- A. Surface-Mounted Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" as follows.
1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
  2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  3. Fabricate cavity wall metal flashing embedded in masonry from stainless-steel with ribs at 3-inch intervals along length of flashing to provide integral mortar bond.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Cheney Flashing Company; Cheney 3-Way Flashing (Sawtooth).
      - 2) Mortar Net "TotalFlash.

4. Fabricate cavity wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2-inch out from wall with outer edge bent down 30 degrees and hemmed.

B. Surface-Mounted Flexible Flashing: Use the following unless otherwise indicated:

1. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D4637/D4637M, 0.040 inch thick.
  - a. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net "TotalFlash" or comparable product as manufactured by one of the following:
    - 1) Carlisle Coatings & Waterproofing; Pre-Kleened EPDM.
    - 2) Firestone Specialty Products; FlashGuard.

C. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge.
4. Where flashing is fully concealed, use flexible flashing.

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

E. Termination Bars for Flexible Flashing: Stainless-steel bars 1/8-inch by 1-inch.

## 2.9 MISCELLANEOUS ANCHORS

A. Post-installed Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Manufacturers:

- a. HILTI.
- b. Simpson Strong-Tie.
- c. Redhead.

2. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

3. Where post-installed anchors are indicated in Drawings, provide type indicated. If not indicated provide either chemical or torque-controlled expansion as required above.

## 2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Preformed Control-Joint Gaskets: Made from PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
    - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
    - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
    - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- C. Weep/Cavity Vent Products: Use the following unless otherwise indicated:
  - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8-inch less than depth of outer wythe in a color selected from manufacturer's standard.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products; Mortar Maze Cell vent.
      - 2) Heckman Building products, Inc.; No. Cell Vent.
      - 3) Hohmann & Barnard, Inc.; QV Quadro-Vent.
      - 4) Wire-Bond; Cell Vent.
- D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Advanced Building Products; Mortar Maze Cell vent.
    - b. Archovations, Inc.; CavClear masonry Mat.
    - c. Heckman Building products, Inc.; No. Cell Vent.
    - d. Hohmann & Barnard, Inc.; QV Quadro-Vent.
    - e. Mortar Net USA, Ltd; Mortar net or Wall Defender.

## 2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.



## 2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Limit cementitious materials in mortar to Portland cement and lime.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. Concrete Masonry Unit Construction:
    - a. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients, use Type S.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION, GENERAL

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

### 3.3 TOLERANCES

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

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16-inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8-inch, with a maximum thickness limited to 1/2-inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8-inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8-inch or minus 1/4-inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8-inch.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
  1. Conduits and built-in items shall not be set in masonry unit cell containing reinforcement.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout full height under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

- H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  - 1. Install compressible filler in joint between top of partition and underside of structure above.
  - 2. Brace non-load bearing interior concrete masonry walls as indicated.
  - 3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."
- I. Decorative CMUs: All burnished masonry units should be drawn from more than one pallet at a time. Cutting: Use the correct type of motor driven masonry saws to make all cuts, including those for bonding, holes, boxes, etc.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of masonry walls, piers, columns, and pilasters over the entire height of the element's construction.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### 3.6 COMPOSITE MASONRY

- A. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
  - 1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.
- B. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
  - 1. Provide rigid metal anchors not more than 24-inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.
  - 2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.

### 3.7 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
  - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. of wall area spaced not to exceed 24-inches o.c. horizontally and 16-inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12-inches of openings and space not more than 36-inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 16-inches o.c. vertically.
    - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
    - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
  - 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

### 3.8 MASONRY JOINT REINFORCEMENT

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

### 3.9 CONTROL JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
  - 1. Install preformed control-joint gaskets designed to fit standard sash block.

### 3.10 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 16-inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8-inches at each jamb unless otherwise indicated.

### 3.11 REINFORCED UNIT MASONRY INSTALLATION

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

### 3.12 FIELD QUALITY CONTROL

- A. Testing and Inspecting: The Owner shall engage special inspectors to perform tests and inspections and prepare reports.

Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

- B. Inspections: Level B special inspections according to the "International Building Code."
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for compressive strength.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- H. In lieu of Unit Strength Method, Prism Test may be performed: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

### 3.13 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

#### 3.14 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200



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## SECTION 047200 - CAST STONE MASONRY

## 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. Cast stone trim and sills.
- B. Related Sections:
  - 1. Section 034500 - "Precast Architectural Concrete" for installing cast-stone sill units on precast concrete panel walls.
  - 2. Section 042113 - "Brick Masonry" for cast stone sills at brick veneer.
  - 3. Section 079200 - "Joint Sealants" for sealing joints in precast concrete panel and cast stone walls.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For cast-stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
  - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Samples for Initial Selection: For colored mortar.
- D. Samples for Verification:
  - 1. For each color and texture of cast stone required, 10-inches square in size.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.

1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.
  1. Provide test reports based on testing within previous two years.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Architectural Precast Association.
- B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- C. Mockups: Furnish cast stone for installation in mockups specified in Section 042000 "Unit Masonry."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work
- B. Pack, handle, and ship cast-stone units in suitable packs or pallets.
  1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast-stone units if required, using dollies with wood supports.
  2. Store cast-stone units on wood skids or pallets with non-staining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

#### 1.7 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.
  1. Comply with cold-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.

2. Environmental Limitations for Sealants: Do not install sealants when ambient and substrate temperatures are outside limits permitted by sealant manufacturer or below 40 deg F or when joint substrates are wet.
  3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide architectural cast stone as manufactured by Custom Cast Stone, Inc. or a comparable product.
- B. Source Limitations for Cast Stone: Obtain cast-stone units from single source from single manufacturer.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

### 2.2 CAST-STONE MATERIALS

- A. General: Comply with ASTM C 1364.
  1. Casting Method: Vibrant Dry Tamp.
  2. Compressive Strength: ASTM C 1194; 6,500 psi minimum at 28 days.
  3. Absorption: ASTM C 642 or C 1195; 6% maximum at 28 days.
- B. Portland Cement: ASTM C 150/C 150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast-stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33/C 33M; gradation and colors as needed to produce required cast-stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33/C 33M, gradation and colors as needed to produce required cast-stone textures and colors.
- E. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.

1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
3. Air-Entraining Admixture: ASTM C 260/C 260M.
4. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
5. Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.
6. Water-Reducing, Accelerating Admixture: ASTM C 494/C 494M, Type E.

G. Reinforcement:

1. As required to withstand handling of structural stresses.
2. Comply with ACI 318.
3. Minimum of 0.25 percent of cross-sectional area of panels which exceed 12-inches in width.
4. Minimum Reinforcing Cover: Twice diameter of reinforcing bars.
5. Deformed steel bars complying with ASTM A 615/A 615M, Grade 60 (Grade 420). Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2- inches of cast-stone material.
  - a. Epoxy Coating: ASTM A 775/A 775M.
  - b. Galvanized Coating: ASTM A 767/A 767M.

H. Embedded Anchors and Other Inserts: Fabricated from steel complying with ASTM A 36/A 36M and hot-dip galvanized to comply with ASTM A 123/A 123M.

## 2.3 CAST-STONE UNITS

- A. Finish: Smooth finish.
- B. Thickness: As noted on the Drawings.
- C. Lengths: Refer to drawings.
- D. Provide all profiles, shapes and sizes of cast stone trim as indicated and noted on the Drawings.
- E. Cast-Stone Units: Comply with ASTM C 1364.
  1. Units shall be manufactured using the wet-cast method.
  2. Units shall be resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.
- F. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
  1. Slope exposed horizontal surfaces to drain as shown on the drawings unless otherwise indicated.

2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.
4. Shapes: Unless otherwise indicated on drawings, provide:
  - a. Suitable wash on exterior sills and coping with exposed top surfaces.
  - b. Drips on projecting components wherever possible.

G. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8-inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8-inch, whichever is greater, but in no case by more than 1/4-inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8-inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8-inch on formed surfaces of units and 3/8-inch on unformed surfaces.

H. Cure Units as Follows:

1. Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:
  - a. No fewer than seven days at mean daily temperature of 50 deg F or above.

I. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

J. Colors and Textures: Provide units with fine-grained texture and buff color resembling smooth-finished Indiana limestone.

## 2.4 MORTAR MATERIALS

A. Provide mortar materials that are compatible with Section 042200 "Concrete Unit Masonry."

B. Portland Cement/Lime Mortars: ASTM C 270, Type N.

1. Composition:

- a. One-part cement ASTM C 150.
- b. One-part lime ASTM C 207.
- c. Six- parts of clean, washed masonry sand ASTM C 144.

C. Basis-of-Design Product: Subject to compliance provide a product by one of the following manufactures:

1. Cemex S.A.B. de C.V.

2. Essroc; Brixment Masonry Cement.
3. Lafarge Holcim (US) Inc.
4. Lehigh Hanson; Heidelberg Cement Group.

D. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4-inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

E. Water: Potable.

## 2.5 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from steel complying with ASTM A 36/A 36M and hot-dip galvanized to comply with ASTM A 123/A 123M.
- B. Dowels: 1/2-inch diameter round bars, fabricated from steel complying with ASTM A 36/A 36M and hot-dip galvanized to comply with ASTM A 123/A 123M.
- C. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cast-stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.
- D. Thru-Wall Flashing: Provide thru-wall flashing with integral drip edge under cast stone coping at CMU site walls.
- E. Window Flashing: Provide SureSill HeadFlash Window Flashing or a comparable product at round window cast stone surround.

## 2.6 MORTAR MIXES

- A. Comply with requirements in Section 042200 "Concrete Unit Masonry" for mortar mixes.
- B. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement-lime mortar unless otherwise indicated.
- C. Comply with ASTM C 270, Proportion Specification.
  1. For setting mortar, use Type S.
  2. For pointing mortar, use Type N.

- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
  - 1. Mix to match Architect's sample.
  - 2. Application: Use colored-aggregate mortar for exposed mortar joints.

## 2.7 SOURCE QUALITY CONTROL

- A. Engage a qualified independent testing agency to sample and test cast-stone units according to ASTM C 1364.
  - 1. Include one test for resistance to freezing and thawing.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 SETTING CAST STONE IN MORTAR

- A. Install cast-stone units to comply with requirements in Section 042200 "Concrete Unit Masonry."
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  - 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.
  - 1. Set units with joints 3/8 to 1/2-inch wide unless otherwise indicated.
  - 2. Build anchors and ties into mortar joints as units are set.
  - 3. Fill dowel holes and anchor slots with mortar.
  - 4. Fill collar joints solid as units are set.
  - 5. Build concealed flashing into mortar joints as units are set.
  - 6. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.



7. Keep joints at shelf angles open to receive sealant.
  8. Provide mitered quirk joint at coping corners.
- E. Rake out joints for pointing with mortar to depths of not less than 3/4-inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8-inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- G. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.
- H. Rake out joints for pointing with sealant to depths of not less than 3/4-inch. Scrub faces of units to remove excess mortar as joints are raked.
- I. Point joints with sealant to comply with applicable requirements in Section 079200 "Joint Sealants."
1. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
- J. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
1. Keep joints free of mortar and other rigid materials.
  2. Build in compressible foam-plastic joint fillers where indicated.
  3. Form joint of width indicated, but not less than 3/8-inch.
  4. Prime cast-stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
  5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

### 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8-inch in 10 feet maximum.
- B. Variation from Level: Do not exceed 1/8-inch in 10 feet maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8-inch in 36-inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16-inch (mm), except where variation is due to warpage of units within tolerances specified.

### 3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
  - 1. Remove mortar fins and smears before tooling joints.
  - 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
  - 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  - 5. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200

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## SECTION 050553 - SECURITY METAL FASTENINGS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes the following:

1. All exposed security fasteners located in the Project including fasteners used in fabrication of project components, shall be security fasteners as specified herein unless specifically excluded in the list below.
2. Excluded equipment, systems and locations.
  - a. Roof mounted equipment.
  - b. Mechanical, electrical, security and technology equipment rooms.
  - c. Above suspended ceilings.
  - d. Behind access panels.
  - e. Within pipe and duct chases.
  - f. Wallboard fasteners.
  - g. Metal and plastic laminate casework hardware.
  - h. Movable furniture.
  - i. Areas outside the secure perimeter of the facility.

- B. Related Sections include the following:

1. Section 055000 -- "Metal Fabrications".
2. Section 055963 -- "Detention Enclosures".
3. Section 081113 -- "Hollow Metal Doors and Frames".
4. Section 083113 -- "Access Doors and Frames".
5. Section 083119 -- "Security Access Doors and Frames".
6. Section 083323 -- "Overhead Coiling Doors".
7. Section 083463 -- "Detention Doors and Frames".
8. Section 085663 -- "Detention Windows".
9. Section 087100 -- "Door Hardware".
10. Section 087163 -- "Detention Door Hardware".
11. Section 095753 -- "Security Ceiling Assemblies".
12. Section 101100 -- "Visual Display Units".
13. Section 102213 -- "Wire Mesh Partitions".
14. Section 102800 -- "Toilet, Bath, and Laundry Accessories".
15. Section 102813 -- "Detention Toilet Accessories".
16. Section 111800 -- "Security Equipment".

17. Section 111916 – “Detention Gun Lockers”.
18. Section 125500 – “Detention Furniture”.
19. Section 135500 – “Prefabricated Modular Steel Cells”
20. Division 21 – Fire Suppression Sections.
21. Division 22 – Plumbing Sections.
22. Division 23 – Heating, Ventilation and Air Conditioning Sections.
23. Division 26 – Electrical Sections.
24. Division 27 – Communications Sections.
25. Division 28 – Electronic Safety and Security Sections.

### 1.3 QUALITY ASSURANCE

- A. Security fasteners shall be installed and removed by tools manufactured for such purpose. Tools shall be produced by security fastener manufacturer or licensed agent.

### 1.4 SUBMITTALS

- A. Confirm with each submittal required by work of various sections, exact type of security fastener proposed for use.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Acument Global Technologies; Acument Intellectual Properties, LLC.
  2. Bryce Fastener.
  3. Safety Socket LLC.
  4. Tamperproof Screw Co., Inc.
  5. Tamper-Pruf Screws.

### 2.2 SECURITY FASTENERS

- A. Drive-System Type: Pinned Torx.
- B. Fastener Strength: 120,000 psi.
- C. Socket Button Head Fasteners:
  1. Heat-treated alloy steel, ASTM F 835.
  2. Stainless-steel, ASTM F 879, Group 1 CW.
- D. Socket Flat Countersunk Head Fasteners:
  1. Heat-treated alloy steel, ASTM F 835.

2. Stainless-steel, ASTM F 879, Group 1 CW.

E. Socket Head Cap Fasteners:

1. Heat-treated alloy steel, ASTM A 574.
2. Stainless-steel, ASTM F 837, Group 1 CW.

F. Protective Coatings for Heat-Treated Alloy Steel:

1. Zinc and clear trivalent chromium where indicated.
2. Zinc phosphate with oil, ASTM F 1137, Grade I, or black oxide unless otherwise indicated.

## 2.3 TOOLS

- A. Provide five (5) complete sets of tools to fit each type and size security screw used on this project.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install security fasteners in accordance with manufacturer's instructions, using proper tools and procedures.
- B. Security fasteners as specified herein shall be obtained by the manufacturer, fabricator, supplier or installer of each component or work requiring their use.
1. It shall be the manufacturer/fabricator's sole responsibility to determine the proper size, type, grade, class, quantity, spacing and location of security fastener for each use/application.
- C. Security fastener installation shall be the sole responsibility of the manufacturer/fabricator and the installing Contractor.

END OF SECTION 050553

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## SECTION 051200 - STRUCTURAL STEEL FRAMING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes:

- 1. Structural steel.
- 2. Grout.

## B. Related Requirements:

- 1. Section 051213 - "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
- 2. Section 055000 - "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other steel items not defined as structural steel.
- 3. Section 078100 - "Applied Fireproofing" and Section 078123 - "Intumescent Fireproofing" for fireproofing materials applied to structural steel.
- 4. Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting" for surface-preparation and priming requirements.

## 1.3 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

## 1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.



## 1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site, or other site as agreed upon by all parties involved.

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment Drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
  - 5. Identify members not to be shop primed.
- C. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Welding certificates: For each person performing welding on the job with approved weld positions indicated.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural steel, including chemical and physical properties.
- E. Product Test Reports: For the following:
  - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
  - 2. Direct-tension indicators.
  - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
  - 4. Shop primers.
  - 5. Nonshrink grout.
- F. Source quality-control reports.
- G. Field quality-control and special inspection reports.

## 1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- C. Shop-Painting Applicators: Qualified according to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- E. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 360.
  - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
  - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
  - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
  - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
  - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated.
2. Use Allowable Stress Design; data are given at service-load level.

B. Construction: Combined system of moment frame and shear walls.

## 2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels and Angles: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
- E. Welding Electrodes: Comply with AWS requirements.

## 2.3 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.
  1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.
- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
  1. Finish: Match connecting steel.
- C. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
  1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
  2. Plate Washers: ASTM A 36/A 36M carbon steel.
  3. Finish: Plain.
- D. Threaded Rods: ASTM A 36/A 36M.
  1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
  2. Plate Washers: ASTM A 36/A 36M carbon steel.
  3. Finish: Plain.

## 2.4 PRIMER

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Primer: Comply with Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting."
- C. Galvanizing Repair Paint: ASTM A 780/A 780M.

## 2.5 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
  - 1. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
  - 2. Mark and match-mark materials for field assembly.
  - 3. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
  - 1. Cut, drill, or punch holes perpendicular to steel surfaces.

2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  1. Joint Type: As indicated on Drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

## 2.8 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2-inches.
  2. Surfaces to be field welded.
  3. Surfaces of high-strength bolted, slip-critical connections.
  4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing) or intumescent paint.
  5. Galvanized surfaces.
  6. Surfaces enclosed in interior construction.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  1. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

- D. Painting: Prepare steel and apply a one-coat, non-asphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

## 2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
  - 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
  - 2. Galvanize lintels, shelf angles, and other steel pieces attached to structural-steel frame and located in exterior walls.

## 2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
  - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
  - 1. Liquid Penetrant Inspection: ASTM E 165.
  - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
  - 3. Ultrasonic Inspection: ASTM E 164.
  - 4. Radiographic Inspection: ASTM E 94.
- D. Prepare test and inspection reports.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

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

### 3.3 ERECTION

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

- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

### 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: As indicated on Drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
  - 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. Verify structural-steel materials and inspect steel frame joint details.
  - 2. Verify weld materials and inspect welds.
  - 3. Verify connection materials and inspect high-strength bolted connections.
- B. Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
  - 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.



- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
  - 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

### 3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting."
- D. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION 051200

## SECTION 051213 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes architecturally exposed structural-steel (AESS).
  - 1. Requirements in Section 051200 "Structural Steel Framing" also apply to AESS.
- B. Related Requirements:
  - 1. Section 051200 "Structural Steel Framing" for additional requirements applicable to AESS.
  - 2. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other steel items not defined as structural steel.
  - 3. Section 078100 "Applied Fireproofing" and Section 078123 "Intumescent Fireproofing" for fireproofing materials applied to structural steel.
  - 4. Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for surface-preparation and priming requirements.

## 1.3 DEFINITIONS

- A. AESS: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.
- B. Category 1 AESS: AESS that is within 96-inches vertically and 36-inches horizontally of a walking surface and that is visible to a person standing on that walking surface or is designated as "Category 1 architecturally exposed structural steel" or "AESS-1" in the Contract Documents.

## 1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

### 1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site, or other site as agreed upon by all parties involved.

### 1.6 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment Drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections. Indicate orientation of bolt heads.
  - 5. Indicate exposed surfaces and edges and surface preparation being used.
  - 6. Indicate special tolerances and erection requirements.

### 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

### 1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172).
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- C. Shop-Painting Applicators: Qualified according to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
  - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

## 1.10 FIELD CONDITIONS

- A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

## PART 2 - PRODUCTS

### 2.1 BOLTS, CONNECTORS, AND ANCHORS

- A. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round-head assemblies, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
  - 1. Finish: Plain.

### 2.2 FILLER

- A. Filler: Polyester filler intended for use in repairing dents in automobile bodies.

### 2.3 PRIMER

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- A. Primer: Comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- B. Etching Cleaner for Galvanized Metal: MPI#25.
- C. Galvanizing Repair Paint: ASTM A 780/A 780M.

## 2.4 FABRICATION

- A. Shop fabricate and assemble AECS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
  - 1. Use special care handling and fabricating AECS before and after shop painting to minimize damage to shop finish.
- B. Category AECS 1:
  - 1. Comply with overall profile dimensions of AWS D1.1/D1.1M for welded built-up members. Keep appearance and quality of welds consistent. Maintain true alignment of members without warp exceeding specified tolerances.
  - 2. Prepare surfaces according to Part 2 "Shop Priming" Article and SSPC-SP 6 (WAB)/NACE WAB-3.
  - 3. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and eased edges.
  - 4. Make intermittent welds appear continuous, using filler or additional welding.
  - 5. Seal weld open ends of hollow structural sections with 3/8-inch closure plates.
  - 6. Limit butt and plug weld projections to 1/16-inch.
  - 7. Install bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
  - 8. Remove weld spatter, slivers, and similar surface discontinuities.
  - 9. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or grinding, before cleaning, treating, and shop priming.
  - 10. Grind tack welds smooth unless incorporated into final welds.
  - 11. Remove backing and runoff tabs, and grind welds smooth.

## 2.5 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
  - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
  - 2. Use weld sizes, fabrication sequence, and equipment for AECS that limit distortions to allowable tolerances.
  - 3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where Category 1 AECS is exposed to weather.
  - 4. Provide continuous welds of uniform size and profile where Category 1 AECS is welded.

5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16-inch, minus zero inch (plus 1.5 mm, minus zero mm) for Category 1 and Category 2 AESS.
6. Make butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16-inch, minus zero inch (plus 1.5 mm, minus zero mm) for Category 1 and Category 2 AESS. Do not grind unless required for clearances or for fitting other components, or unless directed to correct unacceptable work.
7. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for Category 1 and Category 2 AESS.
8. At locations where welding on the far side of an exposed connection of Category 1 and Category 2 AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
9. Make fillet welds for Category 1 and Category 2 AESS oversize and grind to uniform profile with smooth face and transition.
10. Make fillet welds for Category 1 and Category 2 AESS of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

## 2.6 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
1. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
  2. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
  3. Galvanize lintels attached to structural-steel frame and located in exterior walls.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2-inches.
  2. Surfaces to be field welded.
  3. Surfaces to be high-strength bolted with slip-critical connections.
  4. Surfaces to receive sprayed fire-resistive materials.
  5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. SSPC-SP 6.
- C. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

- D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
  - 1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.
  - 2. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

### 3.3 ERECTION

- A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
  - 1. Erect Category 1 AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
  - 2. Erect Category 2 and Category 3 AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.

- B. Do not use thermal cutting during erection.

### 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened.
  - 2. Orient bolt heads in same direction for each connection and to maximum extent possible in same direction for similar connections.
- B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.
  - 1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for Category 1 and Category 2 AESS.
  - 2. Remove erection bolts in Category 1 and Category 2 AESS, fill holes, and grind smooth.
  - 3. Fill weld access holes in Category 1 and Category 2 AESS and grind smooth.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Section 051200 "Structural Steel Framing." The testing agency is not responsible for enforcing requirements relating to aesthetic effect.
- B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

### 3.6 REPAIRS AND PROTECTION

- A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.
- C. Touchup Priming and Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same materials as used for shop priming and painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 051213



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## SECTION 052100 - STEEL JOIST FRAMING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes:

- 1. K-series steel joists.
- 2. K-series steel joist substitutes.
- 3. LH- and DLH-series long-span steel joists.
- 4. Joist accessories.

## B. Related Requirements:

- 1. Section 033000 - "Cast-in-Place Concrete" for installing bearing plates in concrete.
- 2. Section 042200 - "Concrete Unit Masonry" for installing bearing plates in unit masonry.

## 1.3 DEFINITIONS

- A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

## 1.4 ACTION SUBMITTALS

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

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and professional engineer.
- B. Welding certificates.
- C. Manufacturer certificates.
- D. Mill Certificates: For each type of bolt.
- E. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."
  - 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

### 1.7 DELIVERY, STORAGE, AND HANDLING

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

### 1.8 SEQUENCING

- A. Deliver steel bearing plates to be built into masonry construction.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

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

- a. Roof Joists: Vertical deflection of 1/240 of the span.

## 2.2 K-SERIES STEEL JOISTS

- A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
  - 1. Joist Type: K-series steel joists.
- B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
- E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
- F. Camber joists according to SJI's "Specifications."
- G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4-inch per 12-inches (1:48).

## 2.3 LONG-SPAN STEEL JOISTS

- A. Manufacture steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as follows:
  - 1. Joist Type: LH-series steel joists.
  - 2. End Arrangement: Underslung.
  - 3. Top-Chord Arrangement: Parallel or as noted on drawings.
- B. Provide holes in chord members for connecting and securing other construction to joists.
- C. Camber long-span steel joists according to SJI's "Specifications."
- D. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4-inch per 12-inches (1:48).

## 2.4 PRIMERS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
- C. Primer: Provide shop primer that complies with Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting."

## 2.5 JOIST ACCESSORIES

- A. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.
- B. Fabricate steel bearing plates from ASTM A 36/A 36M steel with integral anchorages of sizes and thicknesses indicated.
- C. Steel bearing plates with integral anchorages are specified in Section 055000 "Metal Fabrications."
- D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface unless otherwise indicated.
- E. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
  - 1. Finish: Plain.
- F. Welding Electrodes: Comply with AWS standards.
- G. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

## 2.6 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.
- B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.

- C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.
- D. Shop primer products for joists and joist accessories is specified in Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

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

#### 3.2 INSTALLATION

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

#### 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.
- B. Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test field welds according to AWS D1.1/D1.1M and the following procedures, as applicable:

- a. Liquid Penetrant Inspection: ASTM E 165.
- b. Magnetic Particle Inspection: ASTM E 709.
- c. Ultrasonic Testing: ASTM E 164.
- d. Radiographic Testing: ASTM E 94.

C. Visually inspect bolted connections.

D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.

E. Perform additional testing to determine compliance of corrected Work with specified requirements.

### 3.4 PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

A. Touchup Priming and Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same materials as used for shop priming and painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 052100

## SECTION 053100 - STEEL DECKING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

- 1. Roof deck.
  - 2. Acoustical roof deck.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
  - 2. Section 078100 "Applied Fireproofing".
  - 3. Section 078123 "Intumescent Fireproofing".

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.

- B. Shop Drawings:

- 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

- B. Product Certificates: For each type of steel deck.

- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

- 1. Power-actuated mechanical fasteners.
  - 2. Acoustical roof deck.

- D. Evaluation Reports: For steel deck.



- E. Field quality-control reports.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."
- C. FM Approvals' RoofNav Listing: Provide steel roof deck evaluated by FM Approvals and listed in its RoofNav for Class 1 fire rating and Class 1-90 windstorm ratings. Identify materials with FM Approvals Certification markings.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
  - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- C. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Steel Deck:
    - a. New Millennium Building Systems, LLC.
    - b. Nucor Corp.; Vulcraft Division.
    - c. United Steel Deck, Inc.
- B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
1. Galvanized and shop primed Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 33, G90 zinc coating. (Do not prime steel deck to receive applied fireproofing either spray or intumescent.)
  2. Deck Profile: As indicated.
  3. Profile Depth: As indicated.
  4. Design Uncoated-Steel Thickness: As indicated.
  5. Span Condition: Double span or more.
  6. Side Laps: Overlapped.
- C. Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
1. Galvanized and shop primed Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 33, G90 zinc coating. (Do not prime steel deck to receive applied fireproofing either spray or intumescent.)
  2. Select color from options in subparagraph below.
  3. Deck Profile: As indicated.
  4. Profile Depth: 1-1/2-inches.
  5. Design Uncoated-Steel Thickness: As indicated.
  6. Span Condition: Double span or more.
  7. Side Laps: Overlapped.
  8. Acoustical Perforations: Cellular deck units with manufacturer's standard perforated flat-bottom plate welded to ribbed deck.
  9. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber.
  10. Factory install sound-absorbing insulation into cells of cellular deck.
  11. Acoustical Performance: NRC 0.70 tested according to ASTM C423.

## 2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Mechanical Side-Lap Fasteners (where indicated): Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- G. Weld Washers (where indicated): Uncoated steel sheet, shaped to fit deck rib, 0.0747-inch-thick, with factory-punched hole of 3/8-inch minimum diameter.
- H. Flat Sump Plates: Single-piece steel sheet, 0.0747-inch-thick, of same material and finish as deck. For drains, cut holes in the field.
- I. Galvanizing Repair Paint: ASTM A 780.
- J. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.

- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
  - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

### 3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
  - 1. Weld Diameter: As indicated on drawings.
  - 2. Weld Spacing: As indicated on drawings.
  - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals indicated.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
  - 1. End Joints: Lapped 2-inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one fastener at each corner.
  - 1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.

- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

### 3.5 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

## SECTION 054000 - COLD-FORMED METAL FRAMING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

- 1. Exterior non-load-bearing wall framing.
- 2. Soffit framing.
- 3. Miscellaneous skylight shaft framing.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for masonry shelf angles and connections.
- 2. Section 084523 "Fiberglass Sandwich-Panel Assemblies" for skylight shaft framing.
- 3. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.

- B. Shop Drawings:

- 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
- 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

- C. Delegated-Design Submittal: For cold-formed steel framing.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.

- B. Welding certificates.

- C. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

- D. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- D. Comply with AISI S200 Series "North American Standard for Cold-Formed Steel Framing."

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ClarkDietrich Building Systems.
  2. Nuconsteel, A Nucor Company.
  3. Steel Network, Inc. (The).

## 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
  - 1. Design Loads: As indicated.
  - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/240 of the wall height.
  - 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
  - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
    - a. Upward and downward movement of 1-1/2-inches.
  - 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Design Standards:
  - 1. Wall Studs: AISI S211.
  - 2. Headers: AISI S212.
- D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

## 2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Grade: As required by structural performance.



2. Coating: G60, A60, AZ50, or GF30.

- B. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G60.

#### 2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.043-inch.
2. Flange Width: 1-5/8-inches.

- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: 1-1/4-inches.

- C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 0.043-inch.
2. Flange Width: 1-inch plus the design gap for one-story structures.

- E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

#### 2.5 SOFFIT FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.033-inch.
2. Flange Width: 1-5/8-inches, minimum.

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## 2.6 MISCELLANEOUS SKYLIGHT FRAMING

- A. Provide miscellaneous cold-formed steel framing for skylights.
  - 1. Minimum Base-Metal Thickness: 0.033-inch.

## 2.7 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  - 1. Supplementary framing.
  - 2. Bracing, bridging, and solid blocking.
  - 3. Web stiffeners.
  - 4. Anchor clips.
  - 5. End clips.
  - 6. Foundation clips.
  - 7. Stud kickers and knee braces.
  - 8. End closures.
  - 9. Hole reinforcing plates.
  - 10. Backer plates.

## 2.8 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

## 2.9 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Shims: Load bearing, high-density multi-monomer plastic, and non-leaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.10 FABRICATION

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4-inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

### 3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16-inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

- b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8-inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8-inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: As indicated or as required by delegated design for indicated loads.
- C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
  - 1. Install single deep-leg deflection tracks and anchor to building structure.
  - 2. Connect vertical deflection clips to infill studs and anchor to building structure.
  - 3. Connect drift clips to cold-formed metal framing and anchor to building structure.

- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
  - 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
    - a. Install solid blocking at centers indicated on Shop Drawings.
  - 2. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

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## SECTION 055000 - METAL FABRICATIONS

## 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. Steel framing and supports for countertops.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for coiling door & security barriers.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Loose bearing and leveling plates for applications where they are not specified in other Sections.
6. Pipe Bollards.
7. Metal ladders.
8. Shelf angles.

## B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels and sill angles.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

## C. Related Requirements:

1. Section 033000 - "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 042113 – "Brick Masonry" for installing loose lintels, anchor bolts, and other items built into brick masonry.
3. Section 042200 - "Concrete Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
4. Section 051200 - "Structural Steel Framing."
5. Section 051213 – "Architecturally Exposed Structural Steel Framing" for finishing steel to be permanently exposed.



### 1.3 COORDINATION

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

### 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Paint products.
  - 2. Grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
  - 1. Steel framing and supports for coiling door security screens.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 3. Shelf angles.
  - 4. Loose bearing and leveling plates for applications where they are not specified in other Sections.
  - 5. Pipe Bollards.

### 1.5 INFORMATIONAL SUBMITTALS

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

### 1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- F. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
1. Size of Channels: 1-5/8 by 1-5/8-inches or as indicated.
  2. Material: Galvanized steel, ASTM A 653/A 653M, with G90 (Z275) coating: 0,078-inch nominal thickness.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
1. Provide stainless-steel fasteners for fastening aluminum.

2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.
  - C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).
  - D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
    1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
  - E. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
  - F. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
  - G. Post-Installed Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
    1. Manufacturers:
      - a. HILTI.
      - b. Simpson Strong-Tie.
      - c. Redhead.
    2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
    3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
  - H. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8-inches by length indicated with anchor straps or studs not less than 3-inches long at not more than 8-inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

## 2.4 MISCELLANEOUS MATERIALS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Primer: Comply with Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting."
- C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated. Fabrications at exterior doors shall be considered exterior.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- F. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Concrete: Comply with requirements in Section 033000 - "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 4000 psi (25 MPa).

## 2.5 FABRICATION, GENERAL

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

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use security flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2-inches with a minimum 6-inch embedment and 2-inch hook, not less than 8-inches from ends and corners of units and 24-inches o.c., unless otherwise indicated.

## 2.6. MISCELLANEOUS FRAMING AND SUPPORTS

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

## 2.7 METAL LADDERS

- A. General:
  1. Comply with ANSI A14.3 unless otherwise indicated.
- B. Steel Ladders:
  1. Space siderails as indicated.
  2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
  3. Rungs: 1-inch-diameter steel bars.
  4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
  5. Landings: Bar grating per Section 055313.

6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
7. Support each ladder at top and bottom and not more than 60-inches o.c. with welded or bolted steel brackets. Ladders attached to steel cells shall be welded.
8. Prime ladders, including brackets and fasteners, with primer specified in Section 099123 "Interior Painting".

## 2.8 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize and paint plates.

## 2.9 LOOSE STEEL LINTELS AND SILL ANGLES

- A. Fabricate loose steel lintels and sill angles from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8-inches unless otherwise indicated.
- C. Galvanize and paint loose steel lintels and sill angles located in exterior walls.

## 2.10 METAL BOLLARDS

- A. Fabricate metal bollards from steel shapes, as indicated.
- B. Metal bollard sleeves:
  1. Basis-of-Design: IDEAL SHIELD; 2525 Clark Street, Detroit, Michigan 48209-1355. Phone: (877) 325-0769
  2. Plastic sleeve: Polyethylene Thermoplastic (LDPE) tubes having ultra-violet resistance and anti static properties, nominal thickness 0.250-inches. Color shall be OSHA yellow unless otherwise noted. Size covers for pipe diameters.
  3. Surface of sleeve to be smooth with round top.

## 2.11 STEEL WELD PLATES AND ANGLES

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

## 2.12 FINISHES, GENERAL

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

## 2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
  - 2. Galvanize all exterior steel including lintels, & coiling door & screen supports.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with primers specified in Division 09 Painting Sections.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  1. Cast Aluminum: Heavy coat of bituminous paint.

### 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.

### 3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with non-shrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.4 INSTALLING METAL BOLLARDS

- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.
- C. Install sleeve in accordance with Manufacturer's written recommendations and secure so that removal is only done by mechanical device.



### 3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

## SECTION 055119 - METAL GRATING STAIRS

## 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. Preassembled, straight-run, steel grating stair system and landings.

- B. Related Requirements:

- 1. Section 050553 – "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 2. Section 055000 - "Metal Fabrications" for miscellaneous steel framing and supports for stair system.
  - 3. Section 055213 - "Pipe and Tube Railings" for railings and handrails attached to the metal grating stair stringer framing.

## 1.3 COORDINATION

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

## 1.4 ACTION SUBMITTALS

- A. Product Data: For metal grating stair system and the following:
  - 1. Metal grating.
  - 2. Paint products.
  - 3. Grout.
  - 4. Clips and anchorage devices for gratings.

- B. Shop Drawings: Include plans, elevations, sections, details, and attachments.
- C. Delegated-Design Submittal: For stairs, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 - "Quality Requirements," to design stairs and railings.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Stairs and Platform Uniform Load: 100 lbf/sq. ft.
  - 2. Stairs and Platform Concentrated Load: 300 lbf applied on an area of 4 sq. inch.
  - 3. Uniform and concentrated loads need not be assumed to act concurrently.
  - 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
  - 5. Limit deflection of treads, platforms, and framing members to L/240.
- C. Seismic Performance of Stairs: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. Seismic Component Importance Factor: 1.25

## 2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Steel Bars for Grating Treads: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.
- E. Wire Rod for Grating Crossbars: ASTM A 510 (ASTM A 510M).
- F. Perforated Steel Stair Riser Closure Plates: ASTM A653.
- G. Sheet Steel: Checker Plate ASTM A786.
- H. Hot-dip galvanized zinc coating in accordance with ASTM A123.

## 2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required. Additional Fastener and Supports: Sized by manufacturer to meet structural design criteria.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

## 2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- B. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
  - 1. Join components by welding unless otherwise indicated.
  - 2. Use connections that maintain structural value of joined pieces.
- B. Form exposed work with accurate angles and surfaces and straight edges.
- C. Weld connections to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Weld exposed corners and seams continuously unless otherwise indicated.
  - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 4 welds: good quality, uniform undressed weld with minimal splatter.
- D. Fabricate joints that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

## 2.6 STEEL-FRAMED STAIRS

- A. Standard Stair System: Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled perforated steel sheet risers, metal grating treads, landings and structural plate, channel or angle frames, stringers or connection devices with fasteners/supports.
- B. Manufactures: Subject to compliance with requirements, provide products by one of the following:

1. IKG Industries, Division of Harsco Corp.
  2. Ohio Grating, Inc.
  3. Alabama Metal Industries Corp. (AMICO), Birmingham, AL.
  4. Pacific Stair Corporation.
- C. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Industrial Class, unless more stringent requirements are indicated.
- D. Stair Framing:
1. Fabricate stringers of steel channels.
    - a. Provide closures for exposed ends of channel stringers.
  2. Construct landing platforms of steel plate or channel headers and miscellaneous framing members as needed to comply with performance requirements.
  3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers.
- E. Metal Bar-Grating Stairs and Landings: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
1. Fabricate treads and platforms from welded steel grating with Grating Mark W-19-4: 1-1/2-by-3/16-inch bearing bars at 1-3/16-inch o.c. and crossbars at 4-inches o.c.
  2. Surface: Smooth.
  3. Fabricate grating platforms with nosing matching that on grating treads. Provide toeplates at open-sided edges of grating platforms. Weld grating to platform framing.
  4. Fabricate grating treads with checker plate nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.
  5. Tread Nosing: Checker plate nosing 1-1/4-inch by 1-1/4-inch.
  6. Finish: Hot Dip Galvanized after fabricating in accordance with ASTM A123.

## 2.7 GRATING CLIPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Direct Metals Company LLC.
  2. Grating Fasteners LLC.
  3. Grate Clip Company Inc.

## 2.8 ANCHOR STUD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Nelson Stud Welding
2. Stud Welding Associates
3. Rod Fastener Manufacturing Co. Ltd.
4. Dale Fastener Supply.

B. Special Considerations.

1. Anchor stud at embedded angle frame – Type 316L, unless otherwise indicated.
2. Concrete anchors and inserts – anchor bolts, expansion anchors and concrete inserts.

2.9 STAIR RAILINGS

A. Comply with applicable requirements in Section 055213 - "Pipe and Tube Railings.

1. Rails may be bent at corners, rail returns, and wall returns, instead of using prefabricated fittings.
2. Connect posts to stair framing by direct welding unless otherwise indicated.

2.10 FINISHES

A. Finish metal stairs after assembly.

- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron product.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

3.2 INSTALLING METAL STAIRS

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.

- B. Set steel-stair baseplates on wedges, shims, or leveling nuts. After stairs, have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with edge of bearing plate before packing with grout.
  - 1. Use nonmetallic, nonshrink grout unless otherwise indicated.
  - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
- C. Install stairs, landings and handrails in accordance with manufacturer's instructions. Install square, plumb, straight and true to line and level with neatly fitted joints and intersections.
- D. Minimum Tolerances:
  - 1. Maximum variation of vertical alignment = 0.25-inches per floor, non-accumulative.
  - 2. Maximum differential of true elevation bench marks(s) = > 0.50-inches per floor, non-accumulative.
- F. Field Fitting:
  - 1. Do not cut or alter stair system assemblies or structural components without written authorization.
  - 2. Field welding and joining shall conform to AWS D1.1 and AWS D1.3

### 3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.END OF SECTION 055119.

END OF SECTION 055119



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## SECTION 055213 - PIPE AND TUBE RAILINGS

## 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. Steel pipe and tube railings.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer in the state of Indiana, using performance requirements and design criteria indicated.
- B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
    - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Railing brackets.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer in the State of Indiana responsible for their preparation.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified professional engineer.
- B. Welding certificates.

### 1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

### 1.7 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

## PART 2 - PRODUCTS

### 2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

### 2.2 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

## 2.3 FASTENERS

- A. General: Provide the following:
  - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
  - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
  - 2. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
  - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

## 2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Primer: Comply with Section 099113 - "Exterior Painting" and Section 099123 - "Interior Painting."

## 2.5 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32-inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- F. Connections: Fabricate railings with either welded or nonwelded connections unless otherwise indicated.
- G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- H. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
  - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- I. Form changes in direction as follows:
  - 1. By bending or by inserting prefabricated elbow fittings.
- J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4- inch or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

## 2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- C. Rails and brackets to galvanized, shop primed and field painted by Owner.

## 2.7 STEEL AND IRON FINISHES

- A. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4-inch in 12 feet.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

### 3.2 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

### 3.3 ATTACHING RAILINGS

- A. Attach railings to existing wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
  - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
  - 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

END OF SECTION 055213

## SECTION 055300 - METAL GRATINGS

## 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. Metal bar gratings.
2. Metal frames and supports for gratings.

- B. Related Sections:

1. Section 055119 - "Metal Grating Stairs" for stairs connecting the mezzanine walkway.
2. Section 055213 - "Pipe and Tube Railings" for metal pipe and tube handrails and railings at the mezzanine walkways.
3. Section 135500 - "Prefabricated Modular Steel Cells" for the framing of the mezzanine walkway grating.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design gratings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
  1. Floors: Uniform load of 125 lbf/sq. ft. or concentrated load of 2000 lbf, whichever produces the greater stress.
  2. Floors: Uniform load of 250 lbf/sq. ft. or concentrated load of 3000 lbf, whichever produces the greater stress.
  3. Walkways and Elevated Platforms Other Than Exits: Uniform load of 60 lbf/sq. ft.
  4. Walkways and Elevated Platforms Used as Exits: Uniform load of 100 lbf/sq. ft.
  5. Limit deflection to L/240 or 1/4-inch, whichever is less.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:



1. Clips and anchorage devices for gratings.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified professional engineer.
- B. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

#### 1.6 QUALITY ASSURANCE

- A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual" and NAAMM MBG 532, "Heavy-Duty Metal Bar Grating Manual."
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
  1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  3. AWS D1.3, "Structural Welding Code - Sheet Steel."
  4. AWS D1.6, "Structural Welding Code - Stainless Steel."

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication.

#### 1.8 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

## PART 2 - PRODUCTS

### 2.1 EXPANDED METAL GRATINGS

- A. Provide expanded metal gratings in material, finish, style, size, thickness, weight, and type indicated or, if not indicated, as recommended by manufacturer for indicated applications and as needed to support indicated loads.

### 2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Bars for Bar Gratings: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.
- C. Wire Rod for Bar Grating Crossbars: ASTM A 510.
- D. Uncoated Steel Sheet: ASTM A 1011/A 1011M, structural steel, Grade 30.
- E. Galvanized-Steel Sheet: ASTM A 653/A 653M, structural quality, Grade 33, with G90 coating.
- F. Expanded-Metal Carbon Steel: ASTM F 1267, Class 1.
- G. Expanded-Metal Galvanized Steel: ASTM F 1267, Class 2, Grade A.

### 2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 or Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts, and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 2.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Plain Washers: Round, ASME B18.22.1.

F. Lock Washers: Helical, spring type, ASME B18.21.1.

G. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

## 2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy that is welded.

B. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting."

C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.5 FABRICATION

A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32-inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.

D. Fit exposed connections accurately together to form hairline joints.

- E. Welding: Comply with AWS recommendations and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
  - 1. Fabricate toeplates for attaching in the field.
  - 2. Toeplate Height: 4-inches unless otherwise indicated.
- G. Where gratings are pierced by pipes, ducts, and structural members, cut openings neatly and accurately to size and weld a strap collar not less than 1/8-inch thick to the cut ends. Divide panels into sections only to the extent required for installation where grating platforms and runways are to be placed around previously installed pipe, ducts, and structural members.

## 2.6 METAL BAR GRATINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Alabama Metal Industries Corporation; a Gibraltar Industries company.
  - 2. All American Grating.
  - 3. BarnettBates Corporation.
  - 4. Borden Metal Products (Canada) Limited.
  - 5. Fisher & Ludlow; Division of Harris Steel Limited.
  - 6. Grating Pacific, Inc.
  - 7. Grupo Metelmex, S.A. de C.V.
  - 8. IKG Industries; a division of Harsco Corporation.
  - 9. Marwas Steel Co.; Laurel Steel Products Division.
  - 10. Ohio Gratings, Inc.
  - 11. Seidelhuber Metal Products; Division of Brodhead Steel Products.
- B. Welded Steel Grating:
  - 1. Bearing Bar Spacing: 15/16-inches o.c., unless noted otherwise.
  - 2. Bearing Bar Depth: 1-1/2-inches.
  - 3. Bearing Bar Thickness: 1/4-inch as required to comply with structural performance requirements.
  - 4. Crossbar Spacing: 4-inches o.c.
  - 5. Grating Mark W-11-4 (1 x 3/16) STEEL: 1-by-3/16-inch bearing bars at 11/16-inch o.c., and crossbars at 4-inches o.c.
  - 6. Grating Mark W-15-4 (1 x 1/8) STEEL: 1-by-1/8-inch bearing bars at 15/16-inch o.c., and crossbars at 4-inches o.c.

7. Grating Mark W-19-4 (1-1/4 x 3/16) STEEL: 1-1/4-by-3/16-inch bearing bars at 1-3/16 inches o.c., and crossbars at 4-inches o.c.
  8. Grating Mark W-19-4 (1-1/2 x 3/16) STEEL: 1-1/2-by-3/16-inch bearing bars at 1-3/16-inches o.c., and crossbars at 4 inches o.c.
  9. Grating Mark W-19-4 (2 x 1/4) STEEL: 2-by-1/4-inch bearing bars at 1-3/16-inches o.c., and crossbars at 4-inches o.c.
  10. Grating Mark W-30-4 (5 x 3/8) STEEL: 5-by-3/8-inch bearing bars at 1-7/8-inches o.c., and crossbars at 4-inches o.c.
  11. Grating Mark: As indicated.
  12. Traffic Surface: Plain.
  13. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.
- C. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.
1. Provide no fewer than four weld lugs for each heavy-duty grating section, with each lug shop welded to two bearing bars.
  2. Provide no fewer than four saddle clips for each grating section composed of rectangular bearing bars 3/16-inch or less in thickness and spaced 15/16-inch or more o.c., with each clip designed and fabricated to fit over two bearing bars.
  3. Provide no fewer than four weld lugs for each grating section composed of rectangular bearing bars 3/16-inch or less in thickness and spaced less than 15/16-inch o.c., with each lug shop welded to three or more bearing bars. Interrupt intermediate bearing bars as necessary for fasteners securing grating to supports.
  4. Provide no fewer than four flange blocks for each section of aluminum I-bar grating, with block designed to fit over lower flange of I-shaped bearing bars.
  5. Furnish threaded bolts with nuts and washers for securing grating to supports.
  6. Furnish self-drilling fasteners with washers for securing grating to supports.
  7. Furnish galvanized malleable-iron flange clamp with galvanized bolt for securing grating to supports. Furnish as a system designed to be installed from above grating by one person.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Kee Industrial Products, Inc.; Grating Clip.
      - 2) Lindapter North America, Inc.; Grate-Fast.
- D. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.
1. Edge-band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.
- E. Do not notch bearing bars at supports to maintain elevation.

## 2.7 GRATING FRAMES AND SUPPORTS

- A. Frames and Supports for Metal Gratings: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
  - 1. Unless otherwise indicated, fabricate from same basic metal as gratings.
  - 2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24-inches oc. and provide minimum anchor units in the form of steel straps 1-1/4-inches wide by 1/4-inch-thick by 8-inches long.
  - 3. Unless otherwise indicated, use shapes made from same resin as gratings.
  - 4. Equip units indicated to be cast into concrete or built into masonry with integral anchors.
  - 5. Finish: Galvanize steel frames and supports.

## 2.8 STEEL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish gratings, frames, and supports after assembly.
- C. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- D. Fit exposed connections accurately together to form hairline joints.

1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Attach toeplates to gratings by welding at locations indicated.
- F. Field Welding: Comply with the following requirements:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
- G. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

### 3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach nonremovable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

### 3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
  1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055300

## SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes:

- 1. Wood blocking and nailers.
- 2. Rooftop equipment bases and support curbs.

## B. Related Requirements:

- 1. Section 061600 - "Sheathing" for sheathing, subflooring, and underlayment.
- 2. Section 074240 - "Modular Metal Wall, Roof and Soffit Panels" for wood nailers and blocking.
- 3. Section 075423 - "Thermoplastic Polyolefin (TPO) Roofing" for wood nailers, curbs and blocking at roof.

## 1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2-inches nominal (38 mm actual) or greater but less than 5-inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NHLA: National Hardwood Lumber Association.
  - 3. NLGA: National Lumber Grades Authority.
  - 4. SPIB: The Southern Pine Inspection Bureau.
  - 5. WCLIB: West Coast Lumber Inspection Bureau.
  - 6. WWPAA: Western Wood Products Association.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.



1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For Preservative-treated wood, from ICC-ES:

#### 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

#### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. 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 dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

## 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Treatment shall not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

- E. Application: Treat wood cants, nailers, curbs, equipment support bases, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers and waterproofing.

## 2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including blocking and rooftop equipment bases and support curbs.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber.
  - 1. Hem-fir (north); NLGA.
  - 2. Mixed southern pine; SPIB.
  - 3. Spruce-pine-fir; NLGA.
  - 4. Hem-fir; WCLIB or WWPA.
  - 5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

## 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- F. Expansion Anchors: 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

## 3.1 INSTALLATION, GENERAL

- A. 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.
- B. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Provide blocking as indicated and as required to support curbs, specialty items, and trim.
- D. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- E. Comply with AWP M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code
- G. Use steel common 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 between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

## 3.2 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.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2-inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

## SECTION 061600 - SHEATHING

## 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. This Section includes the following:
  - 1. Wall sheathing.
  - 2. Plywood backing panels.
- B. Related Requirements:
  - 1. Section 42200 – “Concrete Unit Masonry” for anchoring plywood backing panels to CMU wall.
  - 2. Section 092216-- "Non-Structural Metal Framing" for anchoring plywood backing panels.
  - 3. Section 092900 – “Gypsum Board” for anchoring plywood backing panels.

## 1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Wall sheathing.

## 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

## 2.1 WALL SHEATHING

- A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.
  - 1. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corporation or E2XP Extended Exposure Sheathing by Gold Bond (National Gypsum).
  - 2. Type and Thickness: Regular, 1/2-inch thick.
  - 3. Size: 48 by 96-inches for vertical installation.

## 2.2 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  - 2. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

## 2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Application: Treat all plywood backing panels.

## 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
  - 1. For steel framing less than 0.0329-inch thick, attach sheathing to comply with ASTM C 1002.
  - 2. For steel framing from 0.033 to 0.112-inch thick, attach sheathing to comply with ASTM C 954.

## 2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing Board: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing, and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
- B. Sheathing Tape for Glass-Mat Gypsum Sheathing Board: Self-adhering glass-fiber tape, minimum 2-inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing board and with a history of successful in-service use.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- D. 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.
- E. Provide plywood backing behind soffits.



### 3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.
- C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
  - 1. Space fasteners approximately 8-inches o.c. and set back a minimum of 3/8-inch from edges and ends of boards.

### 3.3 SHEATHING JOINT-AND-PENETRATION TREATMENT

- A. Seal sheathing joints according to sheathing manufacturer's written instructions.

### 3.4 PROTECTION

- A. Sheathing: Comply with manufacturers written instructions.

END OF SECTION 061600

## SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

- 1. Modified bituminous sheet waterproofing on all below grade walls at restroom areas under Control rooms and recessed slab at Master Control.

- B. Related Requirements:

- 1. Section 033000 – “Cast-In-Place Concrete” for foundation walls at restroom below Master Control.

## 1.3 PREINSTALLATION MEETINGS

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

- 1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

## 1.4 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
  - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

- B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

- 1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

- C. Samples: For each exposed product and for each color and texture specified, including the following products:

- 1. 8-by-8-inch square of waterproofing and flashing sheet.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample Warranties: For special warranties.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

#### 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
  - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

#### 1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
  - 1. Warranty Period: Five (5) years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.
- C. Source Limitations for Waterproofing System: Obtain waterproofing materials, protection course, and molded-sheet drainage panels from single source from single manufacturer.

## PART 2 - PRODUCTS

## 2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil nominal thickness ASTM D 3767, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive
1. Manufacturers: Subject to compliance with requirements, provide the following:
    - a. Carlisle Coatings & Waterproofing Inc; CCW MiraDRI 860/861.
    - b. Tremco Commercial Sealants and Waterproofing
    - c. Siplast
    - d. Soprema, Inc.
  2. Physical Properties:
    - a. Tensile Strength, Membrane: 325 psi minimum; ASTM D 412, Die C, modified.
    - b. Ultimate Elongation: 350 percent minimum; ASTM D 412, Die C, modified.
    - c. Low-Temperature Flexibility: Pass at minus 40 deg FASTM D 1970/D 1970M.
    - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836/C 836M.
    - e. Puncture Resistance: 60 lbf minimum; ASTM E 154/E 154M.
    - f. Water Absorption: 0.1 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
    - g. Water Vapor Permeance: 0.05 perm maximum; ASTM E 96/E 96M, Water Method.
    - h. Hydrostatic-Head Resistance: 230 feet minimum; ASTM D 5385.
    - i. Tensile Strength, Film: 5000 psi, ASTM D 882.
  3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

## 2.2 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
- F. Protection Course: Extruded-polystyrene foam insulation, ASTM C578, Type IV Standard Specification for Rigid Cellular Polystyrene Thermal Insulation.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide "Perimate" extruded polystyrene foam insulation as manufactured by Dow Chemical Co. or a comparable product by one of the following:
    - a. Johns Manville.
    - b. Owens Corning.
  - 2. Thickness: 2-inches.
  - 3. Thermal Resistance: R-10.
  - 4. Compressive Strength: ASTM D1621 30 psi.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.
  - 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
  - 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- F. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.
  - 1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
  - 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of membrane on horizontal inside corners and as follows:
    - a. At footing-to-wall intersections, extend membrane in each direction from corner or install membrane strip centered over corner.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

### 3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
  - 1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- D. Two-Ply Application: Install sheets to form a membrane with lap widths not less than 50 percent of sheet widths, to provide a minimum of two thicknesses of sheet membrane over areas to receive waterproofing.
- E. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.

- F. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- G. Seal edges of sheet-waterproofing terminations with mastic.
- H. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fish mouths and blisters. Patch with sheet waterproofing extending 6-inches beyond repaired areas in all directions.
- J. Immediately install protection course with butted joints over waterproofing membrane.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests.
- B. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.
- C. Waterproofing will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.5 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326

## SECTION 072100 - THERMAL INSULATION

## 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. Cavity wall insulation and accessories.
  - a. Creates building envelope air barrier and vapor barrier in exterior walls. Separate air barrier product/system not required.
- 2. Concealed building insulation (interior).
- 3. Types of insulation.
  - a. Extruded polystyrene foam-plastic board.
  - b. Glass-fiber blanket.
  - c. Mineral-wool blanket.
  - d. Sprayed-applied polyurethane insulation.

## B. Related Requirements:

- 1. Section 033000 - "Cast-In-Place Concrete" for perimeter insulation at concrete slab and foundation wall.
- 2. Section 042113 - "Brick Masonry" for insulation in exterior cavity wall.
- 3. Section 042200 - "Concrete Unit Masonry" for insulation installed in exterior cavity wall.
- 4. Section 061600 - "Sheathing" for foam-plastic board sheathing installed directly over steel framing.
- 5. Section 075423 - "Thermoplastic Polyolefin (TPO) Roofing" for insulation specified as part of roofing construction.
- 6. Section 092216 - "Non-Structural Metal Framing" for insulation installed in interior partition walls.
- 7. Section 114000 "Food Service Equipment" for insulation at walk-in coolers and freezers.

## 1.3 ACTION SUBMITTALS

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

- 1. Submittals for cavity wall insulation/air barrier system shall be submitted concurrently with masonry ties and associated accessories submittals.



If submittals for each component of system are not submitted concurrently, review of all submittals will be delayed until all component submittals have been received.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.
- C. Certificate from insulation manufacturer that insulation and sheathing assembly has passed specified ASTM E 2357 air barrier testing and specified ASTM E 331 for water penetration.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Thermal Performance Warranty: Manufacturer's minimum fifty (50) year thermal performance warranty for cavity wall insulation.
- B. Insulation assembly manufacturer's representative mockup observations report and three (3) Project observation reports made during installation of materials.

#### 1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with fire-test-response characteristics indicated, as determined by testing identical products in compliance with test method indicated 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. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 136.
- C. Air Barrier Performance: Provide cavity wall insulation and related materials with information from manufacturer indicating insulation assembly has passed testing based on ASTM E 2357, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies or ASTM E 283, Standard Test Method for Determining Rate of Air leakage Through Exterior Windows, Curtainwalls and Doors Under Specified Pressure Difference Across Specimen.
- D. Water Penetration Performance: Provide cavity wall insulation and related materials with information from manufacturer indicating insulation assembly has passed testing based on ASTM E 331, Stand Test method for Water Penetration of Exterior Windows, Skylights, Doors and Curtainwalls by Uniform Static Air Pressure Difference.

- E. Mockup: Provide mockup of cavity wall insulation as part masonry wall mockup specified in Section 042200-Concrete Unit Masonry. Cavity wall insulation manufacturer's representative shall observe and accept mockup prior to continuing cavity wall installation.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
  - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
  - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

### PART 2 - PRODUCTS

#### 2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Wall Extruded Polystyrene Board: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Styrofoam Ultra SL" extruded polystyrene foam insulation board Styrofoam Brand manufactured by Dow Chemical or a comparable product by the following:
    - a. DiversiFoam Products.
    - b. Johns Manville.
    - c. Owens Corning.
  - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
  - 3. Thermal Resistance: ASTM C518 R-Value 5.6 per inch minimum.
  - 4. Compressive Strength: ASTM D1621 psi minimum 25.
  - 5. Total (minimum) Thickness: 3-inches, single layer with ship-lapped vertical edges.

## 2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Foundation Extruded Polystyrene Board: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Scoreboard" extruded polystyrene foam insulation board Styrofoam Brand manufactured by Dow Chemical or a comparable product by the following:
    - a. DiversiFoam Products.
    - b. Johns Manville.
    - c. Owens Corning.
  - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
  - 3. Thermal Resistance: ASTM C518 R-Value 5.0 per inch minimum.
  - 4. Thickness: 2-inches.
  - 5. Compressive Strength: ASTM D1621 psi minimum 25.

## 2.3 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Guardian Building Products, Inc.
    - c. Johns Manville; a Berkshire Hathaway company.
    - d. Knauf Insulation.
    - e. Owens Corning.
- B. Glass-Fiber Sound Attenuation Batts: Maximum flame-spread and smoke-developed indexes of 25 and 50 respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Johns Manville; a Berkshire Hathaway Company.
    - c. Owens Corning.
  - 2. Location: Interior stud partition walls and ceilings as indicated on the drawings.

## 2.4 MINERAL-WOOL INSULATION

- A. Mineral Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
  - 1. Manufacturer's: Subject to compliance with requirements, provide products by one of the following:
    - a. Roxul Inc.
    - b. Thermafiber Inc; an Owens Corning Company.

## 2.5 CLOSED-CELL SPRAY POLYURETHANE FOAM INSULATION

- A. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 2.0 lb./cu. ft. Product shall contain no CFC's or urea formaldehyde. Product shall comply with current State building code, including acceptable fire rating.
  - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Dow Chemical Company; "Froth Pak".
    - b. Dow Chemical Company; "Great Stuff Pro" or "Great Stuff Door and Window"
    - c. Touch'n Seal/Foam Kit 200FR.
    - d. Manufacturer/Product that complies with current State building code for specific application indicated.
  - 2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

## 2.6 ACCESSORIES

- A. Seam Sealant and Transition Material.
  - 1. Provide "LiquidArmor LT" seam-sealing sealant and transition material recommended, approved and warranted by cavity wall rigid-foam-plastic board insulation manufacturer.
- B. Insulation for Miscellaneous Voids:
  - 1. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

- C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

## 2.7 INSULATION FASTENERS

- A. Temporary Fasteners: "Thermal-Grip" ci prong washer manufactured by Rodenhouse Fastening Systems 616-454-3100; [sales@rodenhouse-inc.com](mailto:sales@rodenhouse-inc.com) or a comparable product acceptable to insulation manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions with installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

### 3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
  - 1. Installed insulation shall provide continuous coverage without interruption and be connected to all building envelope components to provide continuous building air barrier when completed.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

- E. Water-Piping Coordination: If water piping is indicated within exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- F. For preformed insulation units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

### 3.4 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
  - 1. If not otherwise indicated, extend insulation a minimum of 24-inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
  - 1. If not otherwise indicated, extend insulation a minimum of 24-inches in from exterior walls.

### 3.5 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

### 3.6 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install units with temporary insulation fasteners as recommended by manufacturer to hold insulation in place until masonry ties are installed. Fit courses of insulation between obstructions with edges butted tightly in all directions. Press units firmly against inside substrates indicated. Seal joints and unavoidable spaces with insulation manufacturer's recommended seam sealant or spray-applied polyurethane foam.
  - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042200 - "Concrete Unit Masonry."
  - 2. Provide bead of sprayed polyurethane foam at bottom of insulation in cavity to seal bottom of insulation to substrate.
  - 3. At top of cavity, provide sprayed polyurethane foam approximately 4-inches high by 2-inches thick full length of wall to seal insulation to substrate.
  - 4. Insulation shall be continuous with no interruptions full height and width of cavity.

- B. Install boards with length of boards (ship-lapped edges) oriented vertically and parallel to studs for ease of installation and to allow water to drain to ground.
  - 1. Secure boards temporarily with “Wind-Lock” fastener only. Complete board installation with two-piece masonry wall ties designed for this purpose and specified in Division 4 “Concrete Unit Masonry”. Drill pilot holes for CMU substrate installation.
  - 2. Wall ties shall be inserted through insulation board according to manufacturer’s instructions. Do not allow shaft of fastener to “drift” or “wobble”. Rubber washer on back of pintle shaft is intended to seal shaft hole in foamboard insulation. Do not necessarily align wall ties with edges of insulation board.
    - a. Should tie shaft hole through foamboard insulation be enlarged, cover exposed portions of hole with seam sealant or specified sprayed polyurethane foam.
- C. Sealing Joints:
  - 1. Seal all joints of rigid cavity insulation including joints with adjacent material other than extruded polystyrene and adjacent construction with seam sealant recommended and warranted by insulation manufacturer.
  - 2. Miscellaneous holes and voids in cavity wall insulation, including enlarged veneer anchoring locations, shall be sealed with seam sealant or specified spray-applied foam insulation.

### 3.7 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. For metal-framed wall cavities where cavity heights exceed 96-inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
  - 5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings and seal each continuous area of insulation to ensure airtight installation.
    - a. Exterior Walls: Set units with facing placed toward interior of construction.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb./cu. ft.

2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

### 3.8 FIELD QUALITY CONTROL:

- A. Cavity wall insulation manufacturer's representative shall make three (3) observations during installation to verify proper installation of insulation/air barrier system assembly and provide report of each observation.
- B. Juncture of Wall to Roof Insulation:
  1. Contractor shall request final in-wall inspection for building envelope completion verification with architect.

### 3.9 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100



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## SECTION 072419 - WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes water-drainage exterior insulation and finish system (EIFS) applied over CMU substrate with moisture drainage.
- B. Exterior wall conditions as shown on Drawings.
- C. Related Sections:
  - 1. Section 042200 – “Concrete Unit Masonry” for wall substrate.
  - 2. Section 077100 – “Roof Specialties” for coping, roof edges and counterflashing.
  - 3. Section 079200 - "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants.

## 1.3 SYSTEM DESCRIPTION

- A. Class PB EIFS: A non-load-bearing, exterior wall cladding system that consists of an insulation board attached adhesively, mechanically, or both to the substrate; an integrally reinforced base coat; and a textured protective finish coat.
- B. Water-Drainage EIFS: EIFS with a means that allows water entering into an EIFS assembly to drain to the exterior.

## 1.4 PERFORMANCE REQUIREMENTS

- A. EIFS Performance: Comply with the following:
  - 1. Bond Integrity: Free from bond failure within EIFS components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
  - 2. Weathertightness: Resistant to water penetration from exterior into water-drainage EIFS and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of EIFS and assemblies behind it, including substrates, supporting wall construction, and interior finish, and including a means that allows water entering into an EIFS assembly to drain to the exterior.

- B. Class PB EIFS: Provide EIFS having physical properties and structural performance that comply with the following:
1. Abrasion Resistance: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested per ASTM D 968, Method A.
  2. Absorption-Freeze Resistance: No visible deleterious effects and negligible weight loss after 60 cycles per EIMA 101.01.
  3. Accelerated Weathering: Five samples per ICC-ES AC235 showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, delamination, or other characteristics that might affect performance as a wall cladding after testing for 2000 hours when viewed under 5 times magnification per ASTM G 155.
  4. Freeze-Thaw: No surface changes, cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination, or indications of delamination between components when viewed under 5 times magnification after 60 cycles per EIMA 101.01.
  5. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate, cured for 28 days, and showing no growth when tested per ASTM D 3273 and evaluated according to ASTM D 3274.
  6. Salt-Spray Resistance: No deleterious effects when tested according to ICC-ES AC235.
  7. Tensile Adhesion: No failure in the EIFS, adhesive, base coat, or finish coat when tested per ASTM C297/E2134.
  8. Water Penetration: Sample consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board, cured for 28 days, and showing no water penetration into the plane of the base coat to expanded polystyrene board interface of the test specimen after 15 minutes at 6.24 lbf/sq. ft. of air pressure difference or 20 percent of positive design wind pressure, whichever is greater, across the specimen during a test period when tested per EIMA 101.02.
  9. Water Resistance: Three samples, each consisting of 1-inch- thick EIFS mounted on 1/2-inch- thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.
  10. Wind-Driven Rain resistance: Resist wind-driven rain according to ICC-ES AC219.
  11. Impact Resistance: Sample consisting of 1-inch- thick EIFS when constructed, conditioned, and tested per EIMA 101.86; and meeting or exceeding the following:
    - a. Standard Impact Resistance: 25 to 49-inch-lb.
    - b. High Impact Resistance: 90 to 150-inch-lb.
  12. Drainage: According to ICC-ES AC235.
  13. Structural Performance Testing: EIFS assembly and components shall comply with ICC-ES AC235 when tested per ASTM E 330.

## 1.5 SUBMITTALS

- A. Product Data: For each type and component of EIFS indicated.

- B. Shop Drawings: For EIFS. Include plans, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, fastening and anchorage details including mechanical fasteners (as applicable), and connections and attachments to other work.
- C. Samples for Initial Selection: For each type of finish-coat color and texture indicated.
  - 1. Include similar Samples of joint sealants involving color selection.
  - 2. Submit manufacturer's full range of standard colors and finishes for Architect's selection.
- D. Samples for Verification: 24-inch square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work including a typical control joint filled with sealant of color selected.
  - 1. Include sealants.
  - 2. Samples to verify color selected.
- E. Qualification Data: For Installer and testing agency.
- F. Manufacturer Certificates: Signed by manufacturers certifying that EIFS and joint sealants comply with requirements.
- G. Material or Product Certificates: For each insulation and joint sealant, from manufacturer.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each water-/weather-resistive barrier, insulation, reinforcing mesh, joint sealant, and coating.
- I. Compatibility and Adhesion Test Reports: For joint sealants from sealant manufacturer indicating the following:
  - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- J. Field quality-control reports.
- K. Maintenance Data: For EIFS to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.
- B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with system components.

- C. Fire-Test-Response Characteristics: Provide EIFS and system components with the following fire-test-response characteristics as determined by testing identical EIFS and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
1. Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E 119.
  2. Full-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which EIFS is a part, complies with UBC Standard 26-4 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies containing foam-plastic insulation.
  3. Full-Scale Diversified Fire Test: Tested mockup, representative of completed multistory wall assembly of which EIFS is a part, showing no significant contribution to vertical or horizontal flame spread per ASTM E 108 modified for testing vertical walls.
  4. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which EIFS is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies containing foam-plastic insulation.
  5. Radiant Heat Exposure: No ignition of EIFS when tested according to NFPA 268.
  6. Potential Heat: Acceptable level when tested according to NFPA 259.
  7. Surface-Burning Characteristics: Provide insulation board, adhesives, base coats, and finish coats with flame-spread index of 25 or less and smoke-developed index of 450 or less, per ASTM E 84.
- D. Mockups: Build 48-inches by 48-inches mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution and set quality standards for fabrication and installation. Include all textures and colors and reveals and any required controlled / expansion joints as recommended by EIFS manufacturer.
- E. Pre-installation Conference: Conduct conference at Project site.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.
- B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
1. Stack insulation board flat and off the ground.
  2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## 1.8 PROJECT CONDITIONS

- A. Weather Limitations: Maintain ambient temperatures above 45 deg F for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

## 1.9 COORDINATION

- A. Coordinate installation of EIFS with related Work specified in other Sections to ensure that wall assemblies, including sheathing, weather-resistant sheathing paper, flashing, trim, joint sealants, windows, and doors, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind flashing and drainage plane that is behind water-drainage EIFS.

## 1.10 WARRANTY

- A. Manufacturer warrants in the limited manner specified herein that the materials manufactured and sold including the air and water resistive barrier components, flashing material, insulation board, adhesive, base coat, mesh and finish, shall be free from defects in the manufacture of the materials. For a period of ten (10) years from the Date of Substantial Completion of the project, when installed in accordance with the manufacturer's current published literature under normal weather conditions and excluding unusual air pollution, the materials will not lose their bond, peel, flake, or chip as a result of such defect in the manufacture of the materials.
- B. For a period of ten (10) years from the Date of Substantial Completion of the project, when installed in accordance with the manufacturers current published literature under normal weather conditions and excluding unusual air pollution, the finish will be water resistant so long as surface integrity is maintained and will be UV fade resistant, except for specially produced colors. For a period of ten (10) years from the Date of Substantial Completion of the project, when installed in accordance with the manufacturer's current published literature by an applicator firm that has completed the manufacturer's training program for the system, the system will effectively drain any moisture that enters the cavity between the insulation board and the air and water resistive barrier.
- C. The applicator shall warrant workmanship separately. The manufacturer shall not be responsible for workmanship associated with installation of the EIFS system.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements provide "Outsulation Plus MD (with moisture drainage)" manufactured by Dryvit Systems, Inc. or a comparable product by one of the following:
1. BASF/Senergy.
  2. Sto Corp.

## 2.2 MATERIALS

- A. Compatibility: Provide water-resistive coating, adhesive, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and with a CMU substrate and approved for use by EIFS manufacturer for Project.
- B. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water/weather-resistive barriers, compatible with substrate, and complying with physical and performance criteria of ICC-ES AC209.
1. Sheathing Joint Compound and Tape: Type recommended by EIFS manufacturer for sealing joints between and penetrations through sheathing.
- C. Primer/Sealer: EIFS manufacturer's standard substrate conditioner with VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation.
- D. Flexible-Membrane Flashing: Cold-applied, fully self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.
- E. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C 578, Type I; EIFS manufacturer's requirements; and EIMA's "EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board" for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:
1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than (6) six weeks or by another method approved by EIMA that produces equivalent results.
  2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, per ASTM E 84.
  3. Dimensions: Provide insulation boards not more than 24 by 48-inches and in thickness indicated but not more than 4-inches thick or less than thickness allowed by ASTM C 1397.
  4. Foam Shapes: Provide with profiles and dimensions indicated on Drawings.

- F. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multi-end strands with retained mesh tensile strength of not less than 120 lbf/in. per ASTM E 2098; complying with ASTM D 578 and the following:
1. Standard-Impact Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
  2. Heavy-Duty Reinforcing Mesh: Not less than 20 oz./sq. yd.
  3. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd.
  4. Detail Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
  5. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd.
- G. Base-Coat Materials: EIFS manufacturer's standard mixture complying with one of the following requirements:
1. Job-mixed formulation of Portland cement complying with ASTM C 150, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with Portland cement.
  2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing Portland cement.
  3. Factory-blended dry formulation of Portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
  4. Factory-mixed non-cementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.
- H. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation with VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with one of the following:
1. Job-mixed formulation of Portland cement complying with ASTM C 150, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with Portland cement.
  2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing Portland cement.
- I. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.
- J. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following:
1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
  2. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, and fillers used with stone particles for embedding in finish coat to produce an applied-aggregate finish.
    - a. Aggregate: Quartz chips of size and color as selected by Architect from manufacturer's full range.



3. Sealer: Manufacturer's waterproof, clear acrylic-based sealer for protecting finish coat.
4. Colors: As selected by Architect from manufacturer's full range.

K. Water: Potable.

L. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard Cell Class for use intended, and ASTM C 1063.

1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
3. Weep Screed/Track: Prefabricated, one-piece type for attachment behind insulation with perforated face leg extended to form a drip and weep holes in track bottom, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg; designed to drain incidental moisture that gets into wall construction to the exterior at terminations of EIFS with drainage.
4. Drainage Strip: Use at EIFS terminations.

## 2.3 ELASTOMERIC SEALANTS

- A. Elastomeric Sealant Products: Provide EIFS manufacturer's listed and recommended chemically curing, elastomeric sealant that is compatible with joint fillers, joint substrates, and other related materials, and complies with requirements for products and testing indicated in ASTM C 1481 and with requirements in Division 07 Section "Joint Sealants" for products corresponding to description indicated below:
1. Multi-component, non-sag urethane sealant.
  2. Single-component, non-sag, neutral-curing silicone sealant.
- B. Preformed Foam Sealant Products: Provide sealant compatible with adjacent materials and complying with requirements in Section 079200 - "Joint Sealants."
- C. Sealant Color: As selected by Architect from manufacturer's full range.

## 2.4 MIXING

- A. General: Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of EIFS.
- B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Begin coating application only after surfaces are dry.
  - 2. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.
- B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.
- C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

### 3.3 EIFS INSTALLATION, GENERAL

- A. Comply with EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

### 3.4 SUBSTRATE PROTECTION APPLICATION

- A. Primer/Sealer: Apply over substrates to protect substrates from degradation and where required by EIFS manufacturer for improving adhesion of insulation to substrate.
- B. Waterproof Adhesive/Base Coat: Apply over sloped surfaces, window sills and parapets to protect substrates from degradation.
- C. Flexible-Membrane Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where indicated by EIFS manufacturer's written instructions to protect wall assembly from degradation. Prime substrates, if required, and install flashing to comply with EIFS manufacturer's written instructions and details.

- D. Air/Moisture Barrier: Trowel or roller apply in a uniform manner per manufacturer's requirements.

### 3.5 TRIM INSTALLATION

- A. Trim: Apply trim accessories at perimeter of EIFS, at window sills, and elsewhere as indicated, according to EIFS manufacturer's written instructions. Coordinate with installation of insulation.
  - 1. Weep Screed/Track: Use at bottom termination edges and at window heads of water-drainage EIFS unless otherwise indicated.
  - 2. Casing Bead: Use at other locations.

### 3.6 INSULATION INSTALLATION

- A. Board Insulation: Adhesively attach insulation to substrate in compliance with EIFS manufacturer's written instructions, and the following:
  - 1. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of sheathing with adhesive once insulation is adhered to sheathing. Apply adhesive to a thickness of not less than 1/4-inch for factory mixed and not less than 3/8-inch for field mixed, measured from surface of insulation before placement.
  - 2. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
  - 3. Allow adhered insulation to remain undisturbed for period recommended by EIFS manufacturer, but not less than 24 hours, before beginning rasping and sanding insulation, or applying base coat and reinforcing mesh.
  - 4. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally.
  - 5. Begin first course of insulation from a level base line and work upward.
  - 6. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
  - 7. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12-inches wide or 6-inches high. Offset joints not less than 6-inches from corners of window and door openings and not less than 4-inches from aesthetic reveals.
    - a. Adhesive Attachment: Offset joints of insulation not less than 6-inches from horizontal and 4-inches from vertical joints in sheathing.
  - 8. Interlock ends at internal and external corners.
  - 9. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16-inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.

10. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
  11. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32-inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16-inch.
  12. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4-inch.
  13. Install foam shapes and attach to sheathing.
  14. Interrupt insulation for expansion joints where indicated.
  15. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
  16. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and between perimeter casing beads and adjoining surfaces of width indicated.
  17. After installing insulation and before applying reinforcing mesh, fully wrap board edges with strip reinforcing mesh. Cover edges of board and extend encapsulating mesh not less than 24-inches over front and back face unless otherwise indicated on Drawings.
  18. Treat exposed edges of insulation as follows:
    - a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
    - b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
    - c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.
  19. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and EIFS protective-coating lamina.
- B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:
1. At expansion joints in substrates behind EIFS. Coordinate with Architect on locations.
  2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
  3. Where EIFS manufacturer requires joints in long continuous elevations.
  4. EIFS manufacturer required to install any and all joints for complete system, whether indicated on Drawings or not.

### 3.7 BASE-COAT INSTALLATION

- A. Base Coat: Apply to exposed surfaces of insulation and foam shapes in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness.

- B. Reinforcing Mesh: Embed type indicated below in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2-inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.
- C. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings extending 24-inches beyond perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 24-inch- wide strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4-inches on each side of corners and at front entry columns.
  - 1. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.

### 3.8 FINISH-COAT INSTALLATION

- A. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.
- B. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.
  - 1. Texture 1 Field Texture: Fine.
  - 2. Texture 2 Accent Texture: Custom Bush Hammered (Match precast concrete panel accent texture).
- C. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

### 3.9 INSTALLATION OF JOINT SEALANTS

- A. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements in Division 07 Section "Joint Sealants" and in ASTM C 1481.
  - 1. Apply joint sealants after base coat has cured but before applying finish coat.
  - 2. Clean surfaces to receive sealants to comply with indicated requirements and EIFS manufacturer's written instructions.
  - 3. Apply primer recommended in writing by sealant manufacturer for surfaces to be sealed.
  - 4. Install sealant backing to control depth and configuration of sealant joint and to prevent sealant from adhering to back of joint.
  - 5. Apply masking tape to protect areas adjacent to sealant joints. Remove tape immediately after tooling joints, without disturbing joint seal.

6. Recess sealant sufficiently from surface of EIFS so an additional sealant application, including cylindrical sealant backing, can be installed without protruding beyond EIFS surface.

### 3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. EIFS Tests and Inspections: For the following:
  1. According to ICC-ES AC219.
- C. Remove and replace EIFS where test results indicate that EIFS do not comply with specified requirements.
- D. Prepare test and inspection reports.

### 3.11 CLEANING AND PROTECTION

- A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072419

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## SECTION 072500 - WEATHER BARRIERS

## 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. Building wrap.

- B. Related Requirements:

- 1. Section 054000 - "Cold-Formed Metal Framing" for cold-formed structural metal framing.
  - 2. Section 061600 - "Sheathing" for exterior wall substrate at structural metal framing.
  - 3. Section 072100 - "Thermal Insulation" for foam-plastic board and batt insulation.

## 1.3 ACTION SUBMITTALS

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

- 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

- B. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.

## PART 2 - PRODUCTS

## 2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.



1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont Building Innovations: E. I. du Pont de Nemours and Company; Tyvek CommercialWrap or a comparable product by one of the following:
    - a. Dow Chemical Company (The).
    - b. Kingspan Insulation.
    - c. Ludlow Coated Products.
    - d. Raven Industries, Inc.
    - e. Reemay, Inc.
  2. Water-Vapor Permeance: Not less than 75 perms per ASTM E 96/E 96M, Desiccant Method (Procedure A).
  3. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg when tested according to ASTM E 2178.
  4. Allowable UV Exposure Time: Not less than three months.
  5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

### PART 3 - EXECUTION

#### 3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
  1. Cut back barrier 1/2-inch on each side of the break in supporting members at expansion- or control-joint locations.
  2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
- C. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.
  1. Seal seams, edges, fasteners, and penetrations with tape.
  2. Extend into jambs of openings and seal corners with tape.

END OF SECTION 072500

## SECTION 072600 - VAPOR RETARDERS

## 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. Polyethylene vapor retarders.
- B. Related Requirements:
  - 1. Section 072100 - "Thermal Insulation" for vapor retarders integral with insulation products.
  - 2. Section 092216 – "Non-Structural Metal Framing" for wall substrate assembly.
  - 3. Section 092900 – "Gypsum Board" for wall substrate assembly.

## 1.3 ACTION SUBMITTALS

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

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

## PART 2 - PRODUCTS

## 2.1 POLYETHYLENE VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6-mil- thick sheet, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

## 2.2 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

- B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

#### 3.2 INSTALLATION OF VAPOR RETARDERS ON FRAMING

- A. Place vapor retarders on side of construction indicated on Drawings.
- B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

#### 3.3 PROTECTION

- A. Protect vapor retarders from damage until concealed by permanent construction.

END OF SECTION 072600

## SECTION 074243- MODULAR METAL WALL, ROOF AND SOFITT PANELS

## 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. Modular metal wall, roof and soffit panels over framed wall system and roof system.
- 2. Modular metal fascia and soffit panels over framed wall system at the main entrance canopy

## B. Related Requirements:

- 1. Section 051200 – “Structural Steel Framing” for attaching and supporting panels to building structure.
- 2. Section 052100 – Steel Joist framing” for attaching and supporting panels to building structure.
- 3. Section 054000 - "Cold-Formed Metal Framing" for wall and soffit substrate framing.
- 4. Section 055000 – “Metal Fabrications” – for miscellaneous steel shapes for attaching and anchoring metal panels.
- 5. Section 061600 - "Sheathing" for exterior wall, roof and soffit sheathing.
- 6. Section 072100 – “Thermal Insulation” for wall and roof assembly insulation.
- 7. Section 075423 – “Thermoplastic Polyolefin (TPO) Roofing” – for roofing membrane system under the modular metal roof panels.
- 8. Section 076200 - “Sheet Metal Flashing and Trim” for sheet metal copings, flashings and reglets.
- 9. Section 0779200 - “Joint Sealants” for field-applied joint sealants.

## 1.3 REFERENCES

- A. ASTM E283-84, Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
- B. ASTM E331-86, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Pressure Difference.
- C. ASTM E330, Structural Performance

#### 1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal composite material panel Installer, metal composite material panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal composite material panels, including installers of storefront, entrance doors and curtain wall.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delay
3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal composite material panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

#### 1.5 DESIGN CRITERIA

- A. The design, fabrication and erection of a complete aluminum building panel system is the responsibility of this subcontractor and is based on the performance criteria specified. The system shall be a dry joint system which shall incorporate a pressure equalized "rainscreen" system on a complete air and vapor seal, not only allowing air and vapor which enters the panel chamber to drain to the exterior of the wall, but will also allow air into the pressuring chamber to provide instantaneous pressure equalization. Vents and drain holes shall be inconspicuously located and in such positions as not to contribute to staining, streaking or marking of the panel face. Emphasis shall be placed upon the prime integrity of the critical inner air/vapor seal.
- B. Design and install specified Aluminum building panel system and all connections to withstand earthquake forces in accordance with the requirements of Governing Building Code.
- B. The specified Aluminum building panel assembly shall be designed to accommodate the structural inter-story drifts and other movements without breakage, dislodgment or connection failure.
- D. Wind and suction loads normal to the plane of the assembly shall be calculated in accordance with the Governing Building Code.

- E. Perimeter Framing Deflection: Deflection of panel perimeter framing member shall not exceed  $L/175$  normal to plane of the wall where  $L$  is the unsupported span of the perimeter framing member
- F. Panel Deflection: Deflection of the panel face shall not exceed  $L/60$  at design load where  $L$  is the unsupported span of the panel
- G. Provide for free noiseless thermal movement of components as may be caused by a temperature variation.
- H. Allow for movement in cladding caused by deflection in structure.
- I. Design wall system to allow for the unobstructed movement of air between the exterior and interior sides of metal cladding in accordance with industry accepted Rain Screen Principles.
- J. Ensure panel exhibits no permanent deformation when subject to design criteria specified.
- K. The system shall provide clear internal paths of drainage in order to drain any trapped moisture to the exterior, discharging moisture in a manner avoiding staining of architectural finishes, collecting in puddles, formation of unsafe icicles and dripping onto pedestrians.
- L. Fasten panel assembly to building structure in a manner which transmits all loads to the main structure without exceeding the capacity of any fastener.
- M. Individual panels shall be removable without disturbing adjacent panels.
- N. Panels shall not warp or buckle when under full design loads.
- O. All fastenings and connectors shall be concealed. Connection and attachment devices shall not cause staining to cladding or other adjoining materials. The anchorage system shall be designed so that the panels are secured yet "free-floating", to accommodate expansion and contraction.
- P. The system shall not incorporate sealant between panel joints.
- Q. Anchor assemblies or connection hardware, including all related connections, tracks, girts, fasteners, etc., for and related to the cladding panels shall be designed, engineered, furnished and installed as required in compliance with the specified design and performance criteria. All such items are schematic and do not necessarily indicate the exact required scope, type, shape or profile. Location and methods of anchoring panels shall be the subcontractor's responsibility, who shall design the cladding panels and connections to suit each specific condition in an acceptable manner complying with requirements specified.
- R. Panel system shall be in compliance with the Governing authorities having jurisdiction.
- S. Pressure Equalized Rainscreen System: Provide Systems that have been tested and passed in accordance with AAMA 508-7

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
  - 1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
  - 2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2-inches per 12-inches.
  - 3. Include all materials, recommendations and details describing the proposed use, design and erection procedures for all anchorage shall be documented and fully described on the shop drawings.
- D. Samples for Verification: For each type of exposed finish required, prepared on samples of size indicated below.
  - 1. Metal Composite Material Panels: Submit two (2) 24 by 24-inches finished sample of each finish selected by Architect. Include fasteners, closures, and other metal composite material panel accessories.

## 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

## 1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

## 1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and shall have a minimum of five (5) years in on-site panel installation and proven experience in this type of work.

- B. Manufacturers Qualifications: Approved manufacturer listed in this Section with minimum ten (10) years experience in manufacturer of similar products in n similar applications.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical metal composite material panel assembly, including corner, soffits, supports, attachments, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.
- B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or another surface damage.
- D. Retain strippable protective covering on metal composite material panels during installation.

#### 1.11 FIELD CONDITIONS

- A. Field Measurements: Panel installer's responsibility to verify locations of structural members, adjoining construction and wall openings dimensions by field measurement before panel fabrication and indicate measurements on final shop drawings.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

#### 1.12 COORDINATION

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



### 1.13 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
- b. Deterioration of metals and other materials beyond normal weathering.
- c. Warranty Period: Two (2) years from date of Substantial Completion.

D. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

### 2.2 ALUMINUM PLATE MATERIAL WALL, ROOF AND SOFFIT PANELS

- A. Metal Wall Panel Systems: Provide factory-formed and -assembled, metal wall and soffit panels fabricated from single skin aluminum plate; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for rainscreen system.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide "SL 2000P" aluminum panel as manufactured by Sobotec Ltd. or a comparable product by one of the following:
    - a. Centria.
    - b. Firestone Building Products
    - c. Keith Panels, Inc.
    - d. Pohl, Inc.
- B. Aluminum Wall, Roof and Soffit Panels: Factory-formed, aluminum dry-joint rain screen panels.
  - 1. Panel joints: Extruded aluminum perimeter frame
  - 2. Extrusion Finish: Shall be mill finish aluminum on concealed side.
  - 3. Panel Clips: As recommended by manufacturer.
  - 4. Subgirts: Minimum .050-inch Z275 galvanized steel as per manufacturer's requirements for panel attachment system.
  - 5. Panel Thickness: 3MM (.125)
  - 6. Panel Sizes: As indicated on drawings.
  - 7. Exterior Finish: Two-coat fluoropolymer system; 0.2-mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat AAMA 620.
    - a. Color: As selected by the Architect from manufacturer's standard colors.
  - 8. Unexposed Finish: Manufacture's standard nominal 0.5-mil nominal DFT backer coating.
  - 9. Exposed Trim, flashings and Fastener Finish: Match panel finish.
    - a. Thickness: 0.040-inch nominal.
    - b. Refer to Section 076200 "Sheet Metal Flashing and Trim".

## 2.3 SUPPORT MEMBERS, FASTENERS, CONNECTORS

- A. Type, size quantity and spacing of all connectors, supporting track, girts, fasteners and other hardware and anchorage devices for panels as required to suit specified standards.
- B. Fastening devices between aluminum or aluminum and other materials shall be aluminum or stainless steel that will not permit staining.
- C. Self-locking fasteners shall be stainless steel with nylon inserts or patches.
- D. Shims shall be metal to match adjacent surfaces. Do not use plastic shims.

## 2.4 FLASHING AND TRIM

- A. Provide custom factory-fabricated integral companion flashing, trims, end caps and finishing components from same material as the aluminum building panels.
- B. Finish: Shall be of matching color with the Aluminum building panels.
- C. Flashing and Trims: Prefinished in accordance with Section 076200 – “Sheet Metal Flashing and Trim”.
- D. Color: As selected by the Architect from manufacturer’s standard colors.

## 2.5 MATERIALS

- A. Aluminum Sheet: Smooth surface coil-coated sheet, ASTM B209, 3105-H14 Alloy.
  - 1. Aluminum Material: Tension-leveled.
  - 2. Thickness: 0.040-inch nominal.
- B. Aluminum Extrusions: ASTM B 221, 3105 Aluminum.

## 2.6 SECONDARY METAL FRAMING (if required)

- A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM C645, Grade 50 with ASTM A 653/A 653M, G90 (Z180) hot-dipped galvanized zinc coating.
  - 1. Hat Channels: 0.0451-inch (16 gage) minimum.
  - 2. Sill Channels: 0.0451-inch (16 gage) minimum.

## 2.7 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.
- B. Extruded Trim: Aluminum, minimum thickness 0.060-inch for trim and .090-inch for structural units. Include manufacturer provided extruded trim for the following locations and as indicated on the Drawings:
  - 1. Base trim.
  - 2. Coping.
  - 3. Panel installation perimeter.
  - 4. Opening perimeters.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance.

- D. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fascia, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.
- E. Splines: Match panel material and finish.
- F. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- G. Panel Sealants: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

## 2.8 ALUMINUM METAL PANEL FABRICATION

- A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Machine fabricated all material in accordance with reviewed shop drawings with straight lines, square corners or smooth bends, free from twists, kinks, warps, dents, and other imperfections which may affect appearance or serviceability.
- C. Provide reinforced panels as required to meet the tolerances specified above.
- D. System shall have a flush appearance from the exterior with no reveal other than module joint width.
- E. Panels shall be aligned with no lap or reveal other than joint width to permit expansion and contraction.
- F. Thickness of the metal and details of assembly and support shall provide sufficient strength and stiffness to resist distortion of finish surface. Exposed edges and ends of metal shall be dressed smooth, free from sharp edges and with no uniform minimum radius corners. Connections and joints exposed to weather shall be constructed to exclude water.
- G. Fasteners shall be concealed.
- H. All necessary holes shall be drilled with clip attachments applied before application of finish.
- I. Trim and flashing shall be factory-fabricated ready for assembly.
- J. Design and fabricate appropriate type, size, quantity and spacing of all sub-connectors, girts, fasteners and other anchorage devices as required to suit the specified standards.

- K. Subgirts may require perforations at regular intervals to permit drainage of cavity.

## 2.9 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Aluminum Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## 2.10 SEALANT

- A. Silicone Sealant: In accordance with Section 079200 – “Sealants”.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

- C. Maximum deviations acceptable to modular metal panel system manufacturer:
  - 1. 1/4-inch in 20 feet vertically or horizontally from face plane of framing.
  - 2. 1/2-inch maximum deviation from flat substrate on any building elevation.
  - 3. 1/8-inch in 5 feet.
- D. Confirm presence of acceptable framing members to match installation requirements of modular metal panel system.
  - 1. Confirm framing minimum .0451-inch/18 gage at maximum 24-inch spacing.
- E. Verify that storefront, entrance doors and curtain wall and or other penetrations match layout on shop drawings.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.
  - 1. Soffit Framing: Wire tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

### 3.3 ALUMINUM PANEL INSTALLATION

- A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Shim or otherwise plumb substrates receiving metal composite material panels.
  - 2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.
  - 3. Install screw fasteners in predrilled holes.
  - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 5. Install flashing and trim as metal composite material panel work proceeds.
  - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  - 7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

- B. Fasteners:
  - 1. Aluminum Panels: All fasteners exposed to the exterior to be concealed.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.
- D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
  - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
  - 1. Horizontal Joinery: Working from base of installation to top, connect upper panel to lower panel at dry seal joinery utilizing field-applied attachment clip.
  - 2. Vertical Joinery: Provide reveal between vertical ends of panels as shown on shop drawings using hardware furnished by manufacturer.
    - a. Install splines where indicated on drawings.
  - 3. Galvanic Action: Where elements of metal composite wall system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
  - 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24-inches of corner or intersection. Where lapped expansion provisions cannot be used, or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant (concealed within joints).

### 3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4-inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.5 FIELD QUALITY CONTROL

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

### 3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.
- B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.



- C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures per Architect's instruction.

END OF SECTION 074243

## SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

## 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. Fully adhered thermoplastic polyolefin (TPO) roofing system.
2. Substrate board.
3. Vapor retarder.
4. Roof insulation.
5. Cover board.
6. Walkways.

- B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 077100 "Roof Specialties" for manufactured copings and roof edge flashings.
3. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

## 1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

## 1.4 PREINSTALLATION MEETINGS

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

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.
- B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
  1. Layout and thickness of insulation.
  2. Base flashings and membrane termination details.
  3. Flashing details at penetrations.
  4. Tapered insulation layout, thickness, and slopes.
  5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
  6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
  7. Tie-in with adjoining air barrier.
- C. Samples for Verification: For the following products:
  1. Roof membrane and flashings.
  2. Walkway pads and rolls.
- D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer manufacturer and testing agency.
- B. Manufacturer Certificates:
  1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

- a. Submit evidence of compliance with performance requirements.
  - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
  - C. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.
  - D. Evaluation Reports: For components of roofing system, from ICC-ES.
  - E. Field Test Reports:
    - 1. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.
  - F. Field quality-control reports.
  - G. Sample Warranties: For manufacturer's special warranties.
- 1.7 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For roofing system to include in maintenance manuals.
- 1.8 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
  - B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- 1.9 DELIVERY, STORAGE, AND HANDLING
- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
  - B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
    - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

#### 1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

#### 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, vapor retarder, substrate board, and other components of roofing system.
  - 2. Warranty Period: Thirty (30) years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
  - 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
  - 1. Zone 1 (Roof Area Field): 60 psf.
  - 2. Zone 2 (Roof Area Perimeter): 90 psf.

3. Zone 3 (Roof Area Corners): 120 psf.

- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
1. Fire/Windstorm Classification: Class 1A-90.
  2. Hail-Resistance Rating: SH.
- E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

## 2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- A. TPO Sheet: ASTM D 6878/D 6878M, internally fabric- or scrim-reinforced, TPO sheet.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Carlisle SynTec Incorporated.
    - b. Firestone Building Products.
    - c. GAF.
    - d. Johns Manville; a Berkshire Hathaway Company.
  2. Source Limitations: Obtain components for roofing system from manufacturers approved by roof membrane manufacturer.
  3. Thickness: 60 mils, nominal.
  4. Exposed Face Color: White.

## 2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Roof Vents: As recommended by roof membrane manufacturer.

1. Size: Not less than 4-inch diameter.
- E. Bonding Adhesive: Manufacturer's standard.
- F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8-inch thick; with anchors.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

## 2.4 VAPOR RETARDER

- A. Laminated Sheet: Polyethylene laminate, two layers, reinforced with cord grid, with maximum permeance rating of 0.62 perm.
  1. Air/Vapor Barrier - a 40-mil composite consisting of 35-mils of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film.
  2. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

## 2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by TPO roof membrane manufacturer.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
  1. Compressive Strength: 20 psi.
  2. Size: Manufacturers standard.
- C. Tapered Insulation: Provide factory-tapered insulation boards.
  1. Material: Match roof insulation.
  2. Minimum Thickness: 1/4-inch.
  3. Slope:
    - a. Roof Field: 1/4-inch per foot unless otherwise indicated on Drawings.
    - b. Saddles and Crickets: 1/2-inch per foot unless otherwise indicated on Drawings.
  4. Minimum thickness at drains: 3-inches.

## 2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
  - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
  - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
  - 3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
- D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M fiber-reinforced gypsum board.
  - 1. Thickness: 1/2-inch.
  - 2. Surface Finish: Unprimed.

## 2.7 TPO WALKWAY PADS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 0.156-inch thick and acceptable to roofing system manufacturer.
  - 1. Size: 30-inches wide continuous roll at metal roof and TPO roof transition for protection from falling water and snow onto the TPO membrane.
  - 2. Color: White.
- B. Molded EPDM Walkway Pads: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads approximately 0.375-inches thick and acceptable to roofing system manufacturer.
  - 1. Size: 30-inches by 30-inches long.
  - 2. Location: Refer to drawings.
  - 3. Color: White.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.



1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

### 3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.
- C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

### 3.4 VAPOR RETARDER INSTALLATION

- A. Laminate Sheet: Loosely lay laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6-inches, respectively.
1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
  2. Continuously seal side and end laps with tape.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

### 3.5 INSULATION INSTALLATION

- A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at end of workday.

- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.
- C. Install insulation under area of roofing to conform to slopes indicated. Roof to be at least 1/4-per foot slope.
- D. Install insulation under area of roofing to achieve required thickness of at least 4-inches. Where overall insulation thickness is 2.7-inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6-inches in each direction.
  - 1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4-inch with insulation.
  - 1. Cut and fit insulation within 1/4-inch of nailers, projections, and penetrations.

### 3.6 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6-inches in each direction.
  - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
  - 2. At internal roof drains, conform to slope of drain sump.
    - a. Trim cover board so that water flow is unrestricted.
  - 3. Cut and fit cover board tight to nailers, projections, and penetrations.
  - 4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
    - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

### 3.7 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- E. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

### 3.8 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

### 3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

### 3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

## 3.11 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS \_\_\_\_\_ of \_\_\_\_\_, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner:
  2. Address:
  3. Building Name/Type:
  4. Address:
  5. Area of Work:
  6. Acceptance Date: \_\_\_\_\_.
  7. Warranty Period: \_\_\_\_\_.
  8. Expiration Date: \_\_\_\_\_.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    - a. lightning;
    - b. peak gust wind speed exceeding \_\_\_\_\_
    - c. fire;
    - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    - f. vapor condensation on bottom of roofing; and
    - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
  2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
  3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

1. Authorized Signature: \_\_\_\_\_.
2. Name: \_\_\_\_\_.
3. Title: \_\_\_\_\_.

END OF SECTION 075423

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## SECTION 077100 - ROOF SPECIALTIES

## 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. Copings.
- 2. Roof-edge specialties.
- 3. Reglets and counterflashings.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
- 2. Section 074243 "Modular Metal Wall, Roof and Soffit Panels" for roof-edge components provided by metal-roof-panel manufacturer.
- 3. Section 077200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
- 4. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

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

- 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
- 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
- 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

## 1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.



B. Shop Drawings: For roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
4. Detail termination points and assemblies, including fixed points.
5. Include details of special conditions.

C. Samples: For each type of roof specialty and for each color and texture specified.

D. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
2. Include copings, roof-edge specialties roof-edge drainage systems reglets and counterflashings made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

## 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

## 1.9 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. FM Approvals' Listing: Manufacture and install copings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with FM Approvals' markings.
- C. SPRI Wind Design Standard: Manufacture and install copings tested according to SPRI ES-1 and capable of resisting the following design pressures:
  - 1. Design Pressure: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that

resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 10 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.

1. Corners: Factory mitered and continuously welded.
2. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.
  - a. Snap-on Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.
3. Basis-of-Design Product: Subject to compliance with requirements, provide Hickman Company, W.P. Permasnap Parapet Wall Coping or a comparable product by one of the following:
  - a. Architectural Products Company.
  - b. ATAS International, Inc.
  - c. Castle Metal Products.
  - d. Cheney Flashing Company.
  - e. Johns Manville.
  - f. Merchant & Evans, Inc.
  - g. Metal-Era, Inc.
  - h. Metal-Fab Manufacturing, LLC.
  - i. MM Systems Corporation.
  - j. National Sheet Metal Systems, Inc.
  - k. Perimeter Systems; a division of Southern Aluminum Finishing Company, Inc.
  - l. Petersen Aluminum Corporation.
4. Formed Aluminum Sheet Coping-Cap Material: Fabricate from one of the following materials:
  - a. Aluminum, 0.063-inch thick as required to meet performance requirements.
    - 1) Surface: Smooth, flat.
    - 2) Finish: Two-coat fluoropolymer.
    - 3) Color: Custom as selected by Architect.
5. Corners: Factory mitered, continuously welded and sealed weathertight.
6. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.

- a. Snap-on-Coping Anchor Plates: Concealed, galvanized-steel sheet, 12-inches wide, with integral cleats.
- b. Face Leg Cleats: Concealed, continuous galvanized-steel sheet.

## 2.3 ROOF-EDGE SPECIALTIES

- A. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous metal receiver with integral drip-edge cleat to engage fascia cover and secure single-ply roof membrane. Provide matching corner units.
  1. 1. Formed Aluminum Sheet Fascia Covers: Aluminum sheet, 0.063 inch thick as required to meet performance requirements.
    - a. Surface: Smooth, flat finish.
    - b. Finish: Two-coat fluoropolymer.
    - c. Color: Custom as selected by Architect.
  2. Corners: Factory mitered and mechanically clinched and sealed watertight.
  3. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
  4. Receiver: Manufacturer's standard material and thickness.

## 2.4 REGLETS AND COUNTERFLASHINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Berridge Manufacturing Company.
  2. Cheney Flashing Company.
  3. Fry Reglet Corporation.
  4. Heckmann Building Products, Inc.
  5. Metal-Era, Inc.
- B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
  1. Zinc-Coated Steel: Nominal 0.022-inch thickness.
  2. Formed Aluminum: 0.050-inch thickness.
  3. Corners: Factory mitered and continuously welded.
  4. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
  5. Concrete Type, Embedded: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
  6. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.

7. Multiuse Type, Embedded: For multiuse embedment in masonry mortar joints.
  8. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4-inches and in lengths not exceeding 12 feet designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:
1. Zinc-Coated Steel: Nominal 0.022-inch thickness.
  2. Formed Aluminum: 0.032-inch thickness.
- D. Accessories:
1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
  2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.
- E. Zinc-Coated Steel Finish: Two-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range.
- F. Aluminum Finish: Two-coat fluoropolymer
1. Color: As selected by Architect from manufacturer's full range.
- 2.5 PARAPET SCUPPERS:
- A. Manufactured with closure flange trim to exterior, 4-inch- wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof.
1. Formed Aluminum: 0.032 inch thick.
- 2.6 MATERIALS
- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- C. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
- D. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

## 2.7 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970/D 1970M; stable after testing at 240 deg F.
2. Low-Temperature Flexibility: ASTM D 1970/D 1970M; passes after testing at minus 20 deg F.

B. Type II (No. 30) felt or self-adhering sheet underlayment is generally used over wood blocking or sheathing when air- and moisture-tight construction is not required; verify need with roof-specialty manufacturer.

C. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

D. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. minimum.

## 2.8 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
2. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
3. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

B. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

## 2.9 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Galvanized-Steel Sheet Finishes:
  - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A 755/A 755M and coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6-inches staggered 24-inches between courses. Overlap side edges not less than 3-1/2-inches. Roll laps with roller. Cover underlayment within 14 days.
- B. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2-inches.
- C. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2-inches.

### 3.3 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  - 4. Torch cutting of roof specialties is not permitted.
  - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
  - 1. Space movement joints at a maximum of 12 feet with no joints within 18-inches of corners or intersections unless otherwise indicated on Drawings.
  - 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2-inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.



### 3.4 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
  - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.
  - 2. Interlock face-leg drip edge into continuous cleat anchored to substrate at manufacturer's required spacing that meets performance requirements. Anchor back leg of coping with screw fasteners and elastomeric washers at manufacturer's required spacing that meets performance requirements.

### 3.5 ROOF-EDGE SPECIALITIES INSTALLATION

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

### 3.6 REGLET AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.
- B. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4-inches over top edge of base flashings.
- C. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4-inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with butyl sealant. Fit counterflashings tightly to base flashings.

### 3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed.

On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

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## SECTION 077200 - ROOF 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. Roof curbs.
2. Pipe portals.
3. Preformed flashing sleeves.

## B. Related Sections:

1. Section 055000 - "Metal Fabrications" for metal vertical ladders for access to roof hatch.
2. Section 075423 - "Thermoplastic Polyolefin (TPO) Roofing" for membrane roofing transition at roof curbs.
3. Section 077100 - "Roof Specialties" for manufactured copings, and counterflashing.
4. Section 087163 - "Detention Door Hardware" for securing roof hatch in secure areas.
5. Refer to mechanical sections for curbs, equipment rails and end supports.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

## 1.4 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- C. Colors: Submit manufacturer's full range of standard color and finishes for Architect's selection.

- D. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.
- E. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
  - 1. Size and location of roof accessories specified in this Section.
  - 2. Method of attaching roof accessories to roof or building structure.
  - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
  - 4. Required clearances.
- F. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.
- G. Warranty: Sample of special warranty.

#### 1.5 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

#### 1.6 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: provide details to provide wind uplift resistance.

## 2.2 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, straight sides, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
- B. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation and mill phosphatized for field painting where indicated.
  - 1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
  - 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.
  - 3. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
  - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- C. Aluminum Sheet: ASTM B 209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
  - 1. Mill Finish: As manufactured.
  - 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.
  - 3. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
  - 4. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
  - 5. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- a. Two-Coat Fluoropolymer Finish: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
6. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
7. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.

## 2.4 PIPE PORTALS

A. Curb-Mounted Pipe Portal: Insulated roof-curb units with welded or mechanically fastened and sealed corner joints, straight sides, with weathertight curb cover with single or multiple collared openings and pressure-sealed penetrations sized for from the side of the unit.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Roof Products and Systems (RPS); a division of Hart & Cooley, Inc.
  - b. Roof Penetration Housings.
  - c. Alta.
  - d. AWI.
2. Provide with minimum 14-inch high non-penetrated curb flashing. Conform to 2015 ICC Energy Code C402, ASTM E2178 and tested to meet wind loads. Provide minimum Fifteen (15) year warranty.

## 2.5 PREFORMED FLASHING SLEEVES

A. Vent Flashing: Metal flashing sleeve or boot, fully welded, insulation filled, with integral deck flange, 14-inches high, with removable metal hood and slotted metal collar.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Custom Solution Roof and Metal Products.
  - b. Menzies Metal Products.
  - c. Thaler Metal Industries Ltd.
2. Metal: Aluminum sheet, 0.063-inch thick, or stainless-steel.
3. Diameter: As required.
4. Finish: Manufacturer's standard.

## 2.8 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. See the Evaluations in Division 06 Section "Rough Carpentry" for information about waterborne preservatives.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPAC2; not less than 1-1/2-inches thick.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
  - 1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- G. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- H. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## 2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.



## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
  - 1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
  - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
  - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
  - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
  - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Roof Curb Installation: Install each roof curb so top surface is level.
- D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- E. Security Grilles: Weld bar intersections and, using tamper-resistant bolts, attach the ends of bars to structural frame or primary curb walls.
- F. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

### 3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Division 09 painting Sections.
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. The architect will determine replacement of roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

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## SECTION 077213 – MANUFACTURED ACCESS CURBS AND COVERS FOR CONVENTIONAL ROOFS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Manufactured Access Curbs and Covers.

## B. Related Sections:

1. Section 075423 – “Thermoplastic Polyolefin (TPO) Roofing” for roofing transition at curb.
2. Section 077100 - "Roof Specialties" for shop-formed metal flashing, roof-drainage systems, and miscellaneous sheet metal trim and accessories.

## 1.2 COORDINATION

- A. Coordinate layout and installation of manufactured access curbs and covers with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

## 1.3 ACTION SUBMITTALS

- A. Submit concurrent with shop drawings for roofing.

- B. Product Data: For each type of roof accessory.

1. Include construction details, material descriptions, dimensions of individual components and profiles, attachment details to resist wind loads, and finishes.

- C. Shop Drawings: For roof accessories.

1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For manufacturer's special warranties.

## 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: To include in operation and maintenance manuals.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Model "RPC-3L" access curb and "RPRC-1" cover as manufactured by Roof Products, Inc. or a comparable product by one of the following:
  - 1. Roof Curb Systems.
  - 2. LM Curbs.

## 2.2 FRAMES

- A. Material: ASTM A 653 G90 hot-dipped Galvanized steel. Minimum 18 gage or heavier gage as engineered by manufacturer.
- B. Corners: Mitered and welded. Bolted connections are not accepted.
- C. Base Plates: Integral to frame and welded.
- D. Internal Reinforcement: As required by Access Curb and Cover design.
- E. Wood Nailers: Factory installed, pressure treated. Size and width as required by Access Curb and Cover design. Consult with RPI.

## 2.3 PERMANENT COVER

- A. Material: ASTM A 653 G90 hot-dipped 14 gage galvanized steel.
- B. Liner: 18 gage galvanized steel.
- C. Internal Reinforcement: As required by Access Curb and Cover design.
- D. Integral lifting lugs.
- E. Insulation: Internally insulated with 1--inch, three-pound density fiberglass insulation.

## 2.4 CURB

- A. Material: 18 gage galvanized steel with 2 x 2 pressure treated wood nailers.
- B. Liner: 22 gage galvanized steel.
- C. Insulation: 1-1/2-inches thick 3 lb. density rigid insulation.

- D. Construct curb to match roof slope with plumb and level top surface.
- E. Curb Height: Minimum 18-inches above finished roof.
- F. Mounting Flange: 2-inches.

## 2.5 GASKETING

- A. Gasketing: 1/4-inch thick, 1-inch wide at roof top units and skylights.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install in accordance with Contract Document provisions and manufacturer's instructions.

### 3.2 COORDINATION

- A. Manufacturer shall coordinate Manufactured Access Curb and Cover sizes and options with the general and/or roofing contractor prior to fabrication.
- B. Shop drawing approval is required before fabrication.

### 3.3 WARRANTY

- A. The manufactured roof curbs shall be guaranteed to be free from defects in materials or workmanship for a period on not less than (5) five years from date of Substantial Completion.

END OF SECTION 077616

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## SECTION 077253 - SNOW GUARDS

## 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. Rail-type, snow retention system and attachments.
- B. Related Requirements:
  - 1. Section 074243 - "Modular Metal Wall, Roof and Soffit Panels" for rail system attachment to the roof panels with related trim and accessories.
  - 2. Section 079200 - "Joint Sealants" for field-applied joint sealants at the rail brackets at the metal roof panels and adjacent materials.

## 1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for snow guards.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
  - 1. Include calculation of number and location of snow guards based on snow load, roof slope, roof type, components, spacings, and finish.
- C. Samples: Full-size unit.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of snow guard, for tests performed by manufacturer and witnessed by a qualified testing agency.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Temperature Change: 120 deg. F, ambient; 180 deg. F, material surfaces.
- B. Structural Performance:
  - 1. Snow Loads: 20 psf – See Structural Drawings.

### 2.2 RAIL-TYPE SNOW RETENTION

- A. Seam-Mounted Metal Snow Guard Pads:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Berger Building Products.
    - b. Drexel Metals
    - c. S-5! Attachment Solutions.
  - 2. Material and Finish: Cast aluminum; (PVDF) paint finish.
  - 3. Color: Match metal roof panels.
  - 4. Rail Crossmember Size: 2.15-inches by 1.5-inches.
  - 5. Rail Configuration: Punched.
  - 6. Location: Modular metal wall panel roof over the lower TPO roof.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.
  - 1. Verify compatibility with and suitability of substrates including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean and prepare substrates for bonding snow guards.
- B. Prime substrates according to snow guard manufacturer's written instructions.

### 3.3 INSTALLATION

- A. Install snow rails according to manufacturer's written instructions. Install one row per side with the rail placement aligning with building wall below.
- B. Attachment for Metal Roofing:
  - 1. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
  - 2. Rib-Mounted Metal Snow Rail Brackets: Stainless-steel brackets attached to vertical ribs of metal roof panels.
    - a. Basis-of-Design Product: Subject to compliance with requirements, provide "Rib or Versa Bracket" as manufactured by S-5 Attachment Solutions or a comparable product.

END OF SECTION 077253

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## SECTION 078100 - APPLIED FIREPROOFING

## 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 sprayed fire-resistive materials.
- B. Related Requirements:
  - 1. Section 051200 - "Structural Steel Framing" for application substrate where required for rating.
  - 2. Section 053100 - "Steel Decking" for application substrate where required for rating.
  - 3. Section 078123 - "Intumescent Fireproofing" for fire-resistive application.
  - 4. Section 099123 - "Interior Painting" for painting sprayed applied fireproofing at Training Room exposed ceiling.

## 1.3 DEFINITIONS

- A. SFRM: Sprayed fire-resistive materials.

## 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Framing plans or schedules, or both, indicating the following:
  - 1. Extent of fireproofing for each construction and fire-resistance rating.
  - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
  - 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.

4. Treatment of fireproofing after application.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Product Certificates: For each type of fireproofing.
- C. Evaluation Reports: For fireproofing, from ICC-ES.
- D. Preconstruction Test Reports: For fireproofing.
- E. Field quality-control reports.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Mockups: Build mockups Indicate portion of Work represented by mockup on Drawings or draw mockup as separate element.
  1. Build mockup of as shown on Drawings.
  2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

#### 1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.
  1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
  2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
  3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
  4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 40 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Description: Provide fireproofing at the following locations: Refer to Indiana Building Code (IBC) Tables 601 and 602 "Fire Resistance Rating for Building Elements".
  - 1. Primary Structural Steel Framing: 2-hour rating which includes:
    - a. Columns.
    - b. Structural members having direct connections to the columns, including girders, beams trusses and spandrels.
    - c. Members of the floor construction and roof construction having direct connections to columns.
    - d. Bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.
  - 2. Roof Assembly: 1- hour rating which includes:
    - 1. Metal roof deck.
    - 2. Roof framing members.
- B. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- C. Source Limitations: Obtain fireproofing from single source.
- D. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- E. Asbestos: Provide products containing no detectable asbestos.

## 2.2 SPRAYED FIRE-RESISTIVE MATERIALS

- A. High-Density Sprayed Fire-Resistive Material: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Monokote MK6 HY by GCP Applied Technologies or comparable material by:
    - a. Isolatek International.
  2. Application: Designated for interior use by a qualified testing agency acceptable to authorities having jurisdiction.
  3. Bond Strength: Minimum 200-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E 736.
  4. Density: Not less than 15 lb/cf density according to ASTM E 605.
  5. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 10 or less.
    - b. Smoke-Developed Index: 10 or less.
  6. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
  7. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
  8. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
  9. Air Erosion: Maximum weight loss of 0.005 g/sq. ft. in 24 hours according to ASTM E 859.
  10. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G 21.
  11. Finish: As selected by Architect from manufacturer's standard finishes.
- B. Medium-Density Sprayed Fire-Resistive Material: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Z106G medium-density cementitious fireproofing as manufactured by GCP Applied Technologies or a comparable product by:
    - a. Isolatek International.
  2. Bond Strength: Minimum 600-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E 736.
  3. Density: Not less than 21 lb/cf density according to ASTM E 605.
  4. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 0.375-inch.

5. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - a. Flame-Spread Index: 10 or less.
  - b. Smoke-Developed Index: 10 or less.
6. Compressive Strength: Minimum 50 PSI according to ASTM E 761.
7. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
8. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
9. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
10. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours according to ASTM E 859.
11. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G 21.
12. Finish: As selected by Architect from manufacturer's standard finishes.

### 2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
  1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.
- C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written instructions. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.
- E. Reinforcing Fabric: Glass or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.



- F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
  - 1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
  - 2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
  - 3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Verify that concrete work on steel deck is complete before beginning fireproofing work.
- C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning fireproofing work.
- D. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

### 3.3 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
  - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
  - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Metal Decks:
  - 1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, is completed.
  - 2. Do not apply fireproofing to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fireproofing.
- E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- F. Spray apply fireproofing to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- G. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- I. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- J. Cure fireproofing according to fireproofing manufacturer's written instructions.

- K. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- L. Finishes: Where indicated, apply fireproofing to produce the following finishes:
  - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
- M. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
  - 1. Test and inspect as required by the IBC, Subsection 1705.13, "Sprayed Fire-Resistant Materials."
- N. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- O. Fireproofing will be considered defective if it does not pass tests and inspections.
  - 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
  - 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- P. Prepare test and inspection reports.

### 3.4 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing is without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

## SECTION 078123 - INTUMESCENT FIREPROOFING

## 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 mastic and intumescent fire-resistive coatings.
- B. Related Requirements:
  - 1. Section 051200 - "Structural Steel Framing" for application substrate where required for rating.
  - 2. Section 051213 - "Architecturally Exposed Structural Steel Framing" for application substrate where required aesthetics and rating.
  - 3. Section 053100 - "Steel Decking" for application substrate where required for rating.
  - 4. Section 078100 - "Applied Fireproofing" for sprayed fire-resistive materials (SFRM).

## 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review products, design ratings, restrained and unrestrained conditions, thicknesses, and other performance requirements.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Framing plans or schedules, or both, indicating the following:
  - 1. Extent of fireproofing for each construction and fire-resistance rating.
  - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
  - 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
  - 4. Treatment of fireproofing after application.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Product Certificates: For each type of fireproofing.
- C. Evaluation Reports: For fireproofing, from ICC-ES.
- D. Field quality-control reports.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 50 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

# PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Description: Provide fire-proofing at the following locations: Refer to Indiana Building Code (IBC) Tables 601 and 602 "Fire Resistance Rating for Building Elements".
  - 1. Primary Structural Steel Framing: 2-hour rating which includes:
    - a. Columns.
    - b. Structural members having direct connections to the columns, including girders, beams trusses and spandrels.
    - c. Members of the floor construction and roof construction having direct connections to columns.
    - d. Bracing members that are essential to the vertical stability of the primary structural frame under gravity loading shall be considered part of the primary structural frame whether or not the bracing member carries gravity loads.

2. Roof Assembly: 1- hour rating which includes:
  1. Metal roof deck.
  2. Roof framing members.
- B. Provide intumescent fireproofing at these locations:
  1. Vestibule B1000.
  2. Lobby B1001.
- C. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- D. Source Limitations: Obtain fireproofing for each fire-resistance design from single source.
- E. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- F. Asbestos: Provide products containing no detectable asbestos.

## 2.2 MASTIC AND INTUMESCENT FIRE-RESISTIVE COATINGS

- A. Mastic and Intumescent Fire-Resistive Coating: Manufacturer's standard, factory-mixed formulation or factory-mixed, multicomponent system consisting of intumescent base coat and topcoat, and complying with indicated fire-resistance design.
  1. Basis-of-Design-Product: Subject to compliance with requirements, provide "A/D Firefilm III" as manufactured by Carboline Company or a comparable product by one of the following:
    - a. Albi Manufacturing; A Division of StanChem, Inc.
    - b. Hilti, Inc.
    - c. International Protective Coatings.
    - d. Isolatek International.
    - e. Sherwin-Williams Company (The).
  2. Application: Designated for "interior general purpose" and "conditioned interior space purpose" use by a qualified testing agency acceptable to authorities having jurisdiction.
  3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design.
  4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.

5. Hardness: Not less than 65, Type D durometer, according to ASTM D 2240.
6. Density: 89 pcf.
7. Finish: Smooth.
  - a. Color and Gloss: As selected by Architect from manufacturer's full range.

## 2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.
- D. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.
- E. Topcoat: Suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
  1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
  2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
  3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.

- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

### 3.3 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
  - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
  - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- E. Spray apply fireproofing to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.



- F. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- G. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- H. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- I. Cure fireproofing according to fireproofing manufacturer's written instructions.
- J. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- K. Finishes: Where indicated, apply fireproofing to produce the following finishes:
  - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
  - 2. Spray-Textured Finish: Finish left as spray applied with no further treatment.
  - 3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.

### 3.4 FIELD QUALITY CONTROL

- A. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- B. Fireproofing will be considered defective if it does not pass tests and inspections.
  - 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
  - 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- C. Prepare test and inspection reports.

### 3.5 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing is without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

- D. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078123

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## SECTION 078413 - PENETRATION FIRESTOPPING

## 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. Penetrations in fire-resistance-rated walls.
  - 2. Penetrations in smoke barriers.
- B. Related Requirements:
  - 1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
  - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

### 1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

### 1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."
      - 2) FM Global in its "Building Materials Approval Guide."

## 2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 3M Fire Protection Products.
    - b. A/D Fire Protection Systems Inc.
    - c. Hilti, Inc.
    - d. Specified Technologies, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
  - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
  - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
  - 1. Permanent forming/damming/backing materials.
  - 2. Substrate primers.
  - 3. Collars.
  - 4. Steel sleeves.

## 2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

## 2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
  - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.



- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  2. Contractor's name, address, and phone number.
  3. Designation of applicable testing and inspecting agency.
  4. Date of installation.
  5. Manufacturer's name.
  6. Installer's name.

### 3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

### 3.6 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
1. First alpha component is one of the following three letters:
    - a. F: Floor penetrations.
    - b. W: Wall penetrations.
    - c. C: Either floor or wall penetrations.
  2. Second alpha component describes the type of construction being penetrated and can include a single letter or dual letters:
    - a. A: Concrete floors with minimum thickness less than or equal to 5-inches.
    - b. B: Concrete floors with minimum thickness greater than 5-inches.
    - c. C: Framed floors
    - d. J: Concrete or masonry walls with a minimum thickness less than or equal to 8-inches.
    - e. K: Concrete or masonry walls with a minimum thickness greater than 8-inches.

- f. L: Framed walls.
- B. Penetration Firestopping Systems with No Penetrating Items **FS-1:**
  - 1. UL-Classified Systems:
    - a. C-AJ-0001-0999 for walls and floors less than 5-inches thick.
    - b. C-BJ-0001-0999 for walls and floors more than 5-inches thick.
    - c. W-J-0001-0999 for walls.
    - d. F-A-0001-0999 for floors less than 5-inches thick.
    - e. F-B-0001-0999 for floors more than 5-inches thick.
- C. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing **FS-2:**
  - 1. UL-Classified Systems:
    - a. C-AJ-1001-1999 for walls and floors less than 5-inches thick.
    - b. C-BJ-1001-1999 for walls and floors more than 5-inches thick.
    - c. W-J-1001-1999 for walls.
    - d. F-A-1001-1999 for floors less than 5-inches thick.
    - e. F-B-1001-1999 for floors more than 5-inches thick.
- D. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing **FS-3:**
  - 1. UL-Classified Systems:
    - a. C-AJ-2001-2999 for walls and floors less than 5-inches thick.
    - b. C-BJ-2001-2999 for walls and floors more than 5-inches thick.
    - c. W-J-2001-2999 for walls.
    - d. F-A-2001-2999 for floors less than 5-inches thick.
    - e. F-B-2001-2999 for floors more than 5-inches thick.
- E. Penetration Firestopping Systems for Electrical Cables **FS-4:**
  - 1. UL-Classified Systems:
    - a. C-AJ-3001-3999 for walls and floors less than 5-inches thick.
    - b. C-BJ-3001-3999 for walls and floors more than 5-inches thick.
    - c. W-J-3001-3999 for walls.
    - d. F-A-3001-3999 for floors less than 5-inches thick.
    - e. F-B-3001-3999 for floors more than 5-inches thick.
- F. Penetration Firestopping Systems for Cable Trays with Electric Cables **FS-5:**
  - 1. UL-Classified Systems:
    - a. C-AJ-4001-4999 for walls and floors less than 5-inches thick.
    - b. C-BJ-4001-4999 for walls and floors more than 5-inches thick.
    - c. W-J-4001-4999 for walls.

- d. F-A-4001-4999 for floors less than 5-inches thick.
- e. F-B-4001-4999 for floors more than 5-inches thick.

G. Penetration Firestopping Systems for Insulated Pipes **FS-6:**

- 1. UL-Classified Systems:
  - a. C-AJ-5001-5999 for walls and floors less than 5-inches thick.
  - b. C-BJ-5001-5999 for walls and floors more than 5-inches thick.
  - c. W-J-5001-5999 for walls.
  - d. F-A-5001-5999 for floors less than 5-inches thick.
  - e. F-B-5001-5999 for floors more than 5-inches thick.

H. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants **FS-7:**

- 1. UL-Classified Systems:
  - a. C-AJ-6001-6999 for walls and floors less than 5-inches thick.
  - b. C-BJ-6001-6999 for walls and floors more than 5-inches thick.
  - c. W-J-6001-6999 for walls.
  - d. F-A-6001-6999 for floors less than 5-inches thick.
  - e. F-B-6001-6999 for floors more than 5-inches thick.

I. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants **FS-8:**

- 1. UL-Classified Systems:
  - a. C-AJ-7001-7999 for walls and floors less than 5-inches thick.
  - b. C-BJ-7001-7999 for walls and floors more than 5-inches thick.
  - c. W-J-7001-7999 for walls.
  - d. F-A-7001-7999 for floors less than 5-inches thick.
  - e. F-B-7001-7999 for floors more than 5-inches thick.

J. Penetration Firestopping Systems for Groupings of Penetrants **FS-9:**

- 1. UL-Classified Systems:
  - a. C-AJ-8001-8999 for walls and floors less than 5-inches thick.
  - b. C-BJ-8001-8999 for walls and floors more than 5-inches thick.
  - c. W-J-8001-8999 for walls.
  - d. F-A-8001-8999 for floors less than 5-inches thick.
  - e. F-B-8001-8999 for floors more than 5-inches thick.

END OF SECTION 078413

## SECTION 078443 - JOINT FIRESTOPPING

## 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. Joints in or between fire-resistance-rated constructions.
  - 2. Joints in smoke barriers.
- B. Related Requirements:
  - 1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
  - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

### 1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

### 1.8 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."
      - 2) Intertek Group in its "Directory of Listed Building Products."

## 2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. 3M Fire Protection Products.
    - b. A/D Fire Protection Systems Inc.
    - c. Hilti, Inc.
    - d. Specified Technologies, Inc.
  - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
  - 1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
  - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
  - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
  - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
  - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6-inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

### 3.5 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

### 3.6 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

END OF SECTION 078443



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## SECTION 079100 - PREFORMED JOINT SEALS

## 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. Preformed, foam joint seals.
- B. Related Requirements:
  - 1. Section 034100 – “Precast Structural Concrete” for vertical joints between non perpendicular precast panels.
  - 2. Section 42200 – “Concrete Unit Masonry” for vertical joints between CMU and precast concrete panel walls.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each preformed joint seal product.
- B. Samples for Verification: For each type and color of preformed joint seal required, provide Samples with joint seals in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint seals.
- C. Preformed Joint Seal Schedule: Include the following information:
  - 1. Joint seal location and designation.
  - 2. Joint width and movement capability.
  - 3. Joint seal manufacturer and product name.
  - 4. Joint seal color.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each preformed joint seal for tests performed by a qualified testing agency.
- B. Warranties: For special warranties.

## 1.5 QUALITY ASSURANCE

- A. Mockups: Install mockups of assemblies specified in other Sections that are indicated to receive preformed joint seals specified in this Section. Use materials and installation methods specified in this Section.

## 1.6 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace preformed joint seals that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish preformed joint seals to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PREFORMED, FOAM JOINT SEALS

- A. Preformed, Foam Joint Seals: Manufacturer's standard joint seal manufactured from urethane or EVA (ethylene vinyl acetate) foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths based on design criteria indicated, with factory- or field-applied adhesive for bonding to substrates.
  - 1. Manufacturers: Subject to compliance with requirements, provide Emshield Security Seal SSW2 as manufactured by Emseal Joint Systems, LLC or a comparable product by by one of the following:
    - a. BASF Corp. - Watson Bowman Acme Corp.
    - b. MM Systems Corporation.
    - c. Nystrom, Inc.
    - d. Pecora Corporation.
  - 2. Design Criteria:
    - a. Nominal Joint Width: As indicated on Drawings.
    - b. Movement Capability: -25 percent/+25 percent.
    - c. Pick resistant.
    - d. 2-hour fire rated.
  - 3. Joint Seal Color: As selected by Architect from full range of industry colors.

## 2.2 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by preformed-joint-seal manufacturer for joint substrates indicated.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to preformed joint seal manufacturer, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces and formulated to promote best adhesion to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with preformed joint seals and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive preformed joint seals, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting preformed-joint seal performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing preformed joint seals to comply with preformed joint seal manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of preformed joint seal, including dust, paints (except for permanent protective coatings tested and approved for seal adhesion and compatibility by seal manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimal bond with preformed joint seals. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
    - d. Exterior insulation and finish systems.
  - 3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint seals. Nonporous joint substrates include the following:
  - a. Metal.
  - b. Glass.
  - c. Porcelain enamel.
  - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by preformed joint seal manufacturer or as indicated by tests or prior experience. Apply primer to comply with joint seal manufacturer's written instructions. Confine primers to areas of joint seal bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of adhesive or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION

- A. General: Comply with preformed joint seal manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Installation of Preformed, Foam Joint Seals:
  1. Install each length of seal immediately after removing protective wrapping.
  2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.
  3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.
  4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.

### 3.4 PROTECTION

- A. Protect preformed joint seals from damage resulting from construction operations or other causes so seals are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated seals immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079100

## SECTION 079200 - JOINT SEALANTS

## 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. Urethane joint sealants.
  - 2. Butyl joint sealants.
  - 3. Latex joint sealants.
  - 4. Security sealants

- B. Related Requirements:

- 1. Section 034100 – “Precast Structural Concrete” for exterior and interior sealant joints at precast panels.
  - 2. Section 042113 – “Brick Masonry” for sealant joints at brick veneer walls.
  - 3. Section 042200 - "Concrete Unit Masonry" for masonry control joint fillers and gaskets.
  - 4. Section 072419 – “Water Drainage Exterior Insulation and Finish System” for joints at EIFS walls.
  - 5. Section 074240 – “Modular Metal Wall, Roof and Soffit Panels” for joints sealants at these locations.
  - 6. Section 079100 - "Preformed Joint Seals" for preformed compressible foam and precured joint seals.
  - 7. Section 081113 – “Hollow Metal Doors and Frames” for sealant joints at door frame and adjacent construction.
  - 8. Section 084113 – “Aluminum-Framed Entrances and Storefronts” for sealant joints at framing and adjacent construction.
  - 9. Section 088000 – “Glazing” for glazing sealants.
  - 10. Section 088853 - "Security Glazing" for security glazing sealants.
  - 11. Section 089119 – “Fixed Louvers” for sealants at louver frame and adjacent construction.
  - 12. Section 095113 - "Acoustical Panel Ceilings" for sealing edge moldings at perimeters with acoustical sealant.
  - 13. Section 321373 - "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:
  - 1. Joint-sealant location and designation.
  - 2. Manufacturer and product name.
  - 3. Type of substrate material.
  - 4. Proposed test.
  - 5. Number of samples required.
- D. Sample Warranties: For special warranties.

### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

### 1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Five (5) years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  2. Disintegration of joint substrates from causes exceeding design specifications.
  3. Mechanical damage caused by individuals, tools, or other outside agents.
  4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

### 2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.



1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dow Corning Corporation; 790.
  - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
  - c. May National Associates, Inc.; Bondaflex Sil 290.
  - d. Pecora Corporation; 301 NS.
  - e. Sika Corporation, Construction Products Division; SikaSil-WS290.
  - f. Tremco Incorporated; Spectrem 1.
- B. Single-Component, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade P, Class 100/50, for Use T.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 890-SL.
    - b. Sika Corporation; SikaSil 728 SL.
    - c. Pecora Corporation; 300 SL.
    - d. Tremco Incorporated; Spectrem 900 SL.
- C. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Omnipus.
    - b. Dow Corning Corporation; 786 Mildew Resistant.
    - c. GE Advanced Materials - Silicones; Sanitary SCS1700.
    - d. Sika Corporation; SikaSil -GP.
    - e. Tremco Incorporated; Tremsil 200 Sanitary.

## 2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; MasterSeal® SL 1™ (formerly Sonolastic SL 1).
    - b. Bostik, Inc.; Bostik® Chem-Calk® 950.
    - c. May National Associates, Inc.; Bondaflex® PUR 35 SL.
    - d. Pecora Corporation; Urexpan NR-201.
    - e. Polymeric Systems, Inc.; Flexiprene® PSI-952.
    - f. Schnee-Morehead, Inc.; Permathane® SM7101.
    - g. Sika Corporation. Construction Products Division; Sikaflex® - 1c SL.
    - h. Tremco Incorporated; Vulkem® 45.

- B. Urethane, M, NS, 50, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pecora Corporation; DynaTrol® II.
    - b. Polymeric Systems, Inc.; PSI-270.
    - c. Tremco Incorporated; Dymeric 240.
    - d. Sika Corporation; Sikaflex 2CNS-EZ
- C. Immersible, Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Uses T and I.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Sika Corporation, Construction Products Division; Sikaflex - 1CSL.
    - b. Tremco Incorporated; Vulkem 45.

## 2.4 POLYSULFIDE JOINT SEALANTS

- A. Multicomponent, Nonsag, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Sonolastic Polysulfide Sealant.
    - b. Pecora Corporation; Synthacalk GC-2+.
    - c. Sika Corporation; Duoflex NS.
- B. Multicomponent, Pourable, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pacific Polymers International, Inc.; Elastoseal 227 Type I.
    - b. W. R. Meadows, Inc.; Deck-O-Seal 125.
    - c. Sika Corporation; Duoflex SL.
- C. Immersible, Multicomponent Nonsag, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T and Use I.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pecora Corporation; Synthacalk GC-2+.
    - b. Sika Corporation; Duoflex NS.

## 2.5 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Sonneborn® Sonolac®.
    - b. Bostik, Inc.; Bostik® Chem-Calk® 600.
    - c. Pecora Corporation; Pecora AC-20® +Silicone.
    - d. Schnee-Morehead, Inc.; Acryl-R® SM8200.
    - e. Tremco Incorporated; Tremflex® 834.

## 2.6 SOLVENT-RELEASE-CURING JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealant: ASTM C 1311.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Bostik, Inc.; Chem-Calk 300.
    - b. Pecora Corporation; BC-158.
    - c. Tremco Incorporated; Tremco Butyl Sealant.

## 2.7 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pecora Corporation; AC-20 FTR.
    - b. USG Corporation; SHEETROCK Acoustical Sealant.
    - c. Tremco, Inc.

## 2.8 SECURITY SEALANTS

- A. Flexible Security Sealant: ASTM C-920, two-part multi-component, non-sag elastomeric polyurethane joint sealant for active joints. Sealant to be abrasion and pick resistant.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pecora Corporation ; "Dynaflex" or a comparable product by one of the following approved by the architect:
  - 2. Properties:
    - a. Elongation Capability: 12 - ½ percent
    - b. Service Temperature Range: 20 to +180 degrees F

- c. Shore A Hardness: 55+
- B. Rigid Security Sealant: Multi-component, Nonsag, High-Solids, High-Modulus Epoxy Resin Pick-Resistant Joint Sealant for non-moving joints: ASTM C 881, Type I, Minimum Shore D Hardness 70±5 (ASTM C661).
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pecora Corporation; DynaPoxy EP-1200.
    - b. Sikadur 31, Hi-Mod Gel; Sika Corp.
  - 2. Properties:
    - a. Elongation Capability: 0
    - b. Service Temperature Range: - 20 to +180 degrees F.
    - c. Shore A Hardness: 95

## 2.9 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. 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.
- C. 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. Provide self-adhesive tape where applicable.

## 2.10 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
    - d. Exterior insulation and finish systems.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant.

Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

- H. Security Sealants. Install security sealants in all areas within the secure perimeter of the jail that will be used or occupied by Inmates.
  - 1. All areas where security sealants are to be installed shall be sealed so that a business card, razor blade or similar item cannot be concealed in the joint.

### 3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.6 JOINT-SEALANT SCHEDULE

- A. Flexible Security Joint-Sealant Application: Interior moving joints not exceeding 12.5% movement in compression or extension in vertical surfaces and horizontal surfaces within the secure perimeter of the jail.
  - 1. Joint Locations:
    - a. Vertical joints on exposed surfaces of interior unit masonry walls and gypsum board partitions.
    - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
    - c. Joints between precast concrete hollowcore slabs exposed to view.
    - d. Formed joints and saw-cut joints in concrete floor slabs.
    - e. Perimeter joints between interior wall surfaces and concrete floor slabs.
    - f. Perimeter joints between security ceiling systems and wall surfaces.
    - g. Perimeter of detention furnishings and equipment (benches, etc.) in contact with adjacent surfaces. Includes joints on bottom side of equipment, bunks and tables.
    - h. Seal joints between intermittent welds in detention furnishings and metal fabrications that are not continuously welded or sealed prior to shipping.

Seal all narrow joints so an object as thin as a business card cannot be concealed in the joint.

- i. Perimeter of security plumbing fixtures.
- j. Other joints as indicated.

- 2. Joint Sealant: Flexible Urethane Security Sealant.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Rigid Security Joint-Sealant Application: Interior non-moving joints in vertical surfaces and horizontal surfaces within the secure perimeter of the jail.

- 1. Joint Locations:
  - a. Perimeter of embeds and mounting brackets.
  - b. Perimeter of detention accessories (mirrors, clothes hooks, shelving, grab bars, etc.).
  - c. Perimeter of grilles and diffusers.
  - d. Perimeter of light fixtures.
  - e. Other joints as indicated.
- 2. Joint Sealant: Rigid Epoxy Security Sealant.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

3.7 JOINT-SEALANT SCHEDULE (for Areas outside the secure perimeter)

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

- 1. Joint Locations:
  - a. Isolation, contraction and saw-cut joints in cast-in-place concrete slabs.
  - b. Joints between different materials listed above.
  - c. Other joints as indicated.
- 2. Urethane Joint Sealant: Single component, pourable, traffic grade.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.

- 1. Joint Locations:
  - a. Joints in pedestrian plazas.
  - b. Other joints as indicated.
- 2. Urethane Joint Sealant: Immersible, single component, pourable, traffic grade.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.



1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Control and expansion joints in unit masonry.
    - c. Joints in dimension stone cladding.
    - d. Joints between metal panels.
    - e. Joints between different materials listed above.
    - f. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
    - g. Control and expansion joints in ceilings and other overhead surfaces.
    - h. Other joints as indicated.
  2. Urethane Joint Sealant: Multicomponent, nonsag, Class 50.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. All horizontal joints in cast-in-place concrete slabs including saw-cut joints.
    - b. Control and expansion joints in tile flooring.
    - c. Other joints as indicated.
  2. Urethane Joint Sealant: Single component, pourable, traffic grade.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Tile control and expansion joints.
    - d. Vertical joints on exposed surfaces of interior unit masonry walls and gypsum board partitions.
    - e. Joints on underside of exposed plant-precast structural concrete beams and planks.
    - f. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
    - g. Other joints as indicated.
  2. Joint Sealant: Acrylic Latex.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:

- a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Joints between food-service equipment and adjacent walls.
    - c. Other joints as indicated.
  2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Setting Beds for door thresholds.
1. Joint Sealant: Solvent-Release-Curing Joint Sealant.
  2. Joint-Sealant Color: Black.
- H. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Joints between food-service equipment and adjacent walls.
    - c. Other joints as indicated.
  2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- I. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Location:
    - a. Acoustical joints where indicated.
    - b. Other joints as indicated.
  2. Joint Sealant: Acoustical.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- J. Joint-Sealant Application: Setting Beds for door thresholds.
1. Joint Sealant: Solvent-Release-Curing Joint Sealant.
  2. Joint-Sealant Color: Black.

END OF SECTION 079200

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## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

## 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. Hollow-metal doors and frames.
- 2. Fire-rated hollow-metal doors, transom panels and frames.

- B. Related Requirements:

- 1. Section 042200 - "Concrete Unit Masonry" for embedding anchors for hollow metal work into the masonry construction.
- 2. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
- 3. Section 083463 - "Detention Doors and Frames" for hollow-metal doors and frames for detention facilities.
- 4. Section 087100 - "Door Hardware" for doors located in non-inmate occupied areas.
- 5. Section 087163 - "Detention Door Hardware" for doors located in inmate occupied areas.
- 6. Section 135500 - "Prefabricated Modular Steel Cells" for detention steel doors and frames included with modular steel cells.

## 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

## 1.4 COORDINATION

- A. Coordinate anchorage installation 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.

## 1.5 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
1. Elevations of each door type.
  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 each different wall opening condition.
  6. Details of anchorages, joints, field splices, and connections.
  7. Details of accessories.
  8. Details of moldings, removable stops, and glazing.
  9. Details of conduit and preparations for power, signal, and control systems.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Apex Industries.
  - 2. Ceco Door; ASSA ABLOY.
  - 3. Curries Company; ASSA ABLOY.
  - 4. Pioneer Industries.
  - 5. Republic Doors and Frames.
  - 6. Steelcraft; an Allegion brand
  - 7. Titan Doors
  - 8. Metal Products, Inc.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

## 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite and Transom Assemblies: Complying with NFPA 80 and 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 or UL 9.

## 2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
  - 1. Physical Performance: Level B according to SDI A250.4.
  - 2. Doors and Transom Panels:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4-inches.

- c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042-inch, (18 gage).
  - d. Edge Construction: Model 1, Full Flush.
  - e. Core: Manufacturer's standard kraft-paper honeycomb, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
- 3. Frames:
  - a. Materials: Uncoated steel sheet, minimum thickness of 0.053-inch (16 gage).
  - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
  - c. Construction: Full profile welded.
- 4. Exposed Finish: Prime ready for paint application without additional preparation.

## 2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4.
  - 1. Physical Performance: Level A according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4-inches.
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.067-inch (14 gage), with minimum A40 coating.
    - d. Edge Construction: Model 1, Full Flush.
    - e. Core: Polyisocyanurate.
      - 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 4 when tested according to ASTM C 1363.
  - 3. Frames:
    - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053-inch, (16 gage) with minimum A40 coating.
    - b. Construction: Full profile welded.
  - 4. Exposed Finish: Prime.

## 2.5 BORROWED LITES

- A. Hollow-metal frames of uncoated steel sheet, minimum thickness of 0.067-inch (14 gage).

- B. Construction: Full profile welded.

## 2.6 FRAME ANCHORS

### A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, 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, welded to back of frames; not less than 0.042-inch thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 1/2-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042-inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

## 2.7 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Grout: ASTM C 476, except with a maximum slump of 4-inches, as measured according to ASTM C 143/C 143M.



- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Section 088000 "Glazing".
- I. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.8 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 metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  - 1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026-inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6-inches apart. Spot weld to face sheets no more than 5-inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
  - 2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
  - 3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8-inch in 2-inches.
  - 4. Top Edge Closures: Close top edges of doors with inverted closures of same material as face sheets.
  - 5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
  - 6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: 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.
  - 1. Sidelite 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.
  - 2. Exposed Fasteners: Provide countersunk, flat- or oval-head exposed security screws and bolts for exposed fasteners.
  - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.

5. Jamb Anchors: Provide number and spacing of anchors as follows:
  - a. Masonry Type: Locate anchors not more than 16-inches from top and bottom of frame. Space anchors not more than 32-inches o.c., to match coursing, 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 one 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 one additional anchor per jamb for each 24-inches or fraction thereof above 96-inches high.
  - c. Postinstalled Expansion Type: Locate anchors not more than 6-inches from top and bottom of frame. Space anchors not more than 26-inches o.c.
    - 1) Minimum 1/2-inch diameter concealed bolts with countersunk head and expansion shields or inserts. Provide 14-gage steel tube spacer from frame to wall, welded to frame. Reinforce frame at anchor locations with 14-gage steel backup plate.
6. Head Anchors: Two anchors per head for frames more than 42-inches wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
  - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
  - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
  1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  - 1. Stop Height: Provide minimum stop height of 0.625-inch for door openings and minimum stop height of 3/4-inches for glazing, unless otherwise indicated.
    - a. Provide 1 1/4-inch by 1 1/4-inch angle glazing stops inside the secure perimeter of the facility.
  - 2. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  - 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
  - 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

## 2.9 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure. Primer must be paint ready without any additional painter preparation.

## 2.10 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding.
- B. Grout Guards: Formed from same material as frames, not less than 0.016-inch thick.

## PART 3 - EXECUTION

### 3.1 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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 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. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

### 3.3 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: Comply with SDI A250.11 or NAAMM-HMMA 840.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    - b. Install frames with removable stops located on secure side of opening.
  - 2. Fire-Rated Openings: Install frames according to NFPA 80.
  - 3. Floor Anchors: Secure with postinstalled expansion anchors.
  - 4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  - 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
    - a. Field apply bituminous coating to backs of frames that will be filled with grout.
  - 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  - 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
    - a. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16-inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8-inch plus or minus 1/32-inch.
    - b. Between Edges of Pairs of Doors: 1/8-inch to 1/4-inch plus or minus 1/32-inch.
    - c. At Bottom of Door: 3/4-inch plus or minus 1/32-inch.
    - d. Between Door Face and Stop: 1/16-inch to 1/8-inch plus or minus 1/32-inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head security machine screws spaced uniformly not more than 9-inches o.c. and not more than 2-inches o.c. from each corner.

### 3.4 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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

## SECTION 081416 - FLUSH WOOD DOORS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors with wood-veneer faces.
  - 2. Factory finishing flush wood doors.
- B. Related Requirements.
  - 1. Section 081113 – “Hollow Metal Doors and Frames” frames for flush wood doors.
  - 2. Section 087100 – “Door Hardware” for hardware in these door types.
  - 3. Section 088000 - "Glazing" for glass view panels in flush wood doors.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of mortises and holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
  - 5. Requirements for veneer matching.
  - 6. Doors to be factory finished and finish requirements.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
  - 1. Factory finishes applied to actual door face materials, approximately 8 by 10-inches for each material and finish.
  - 2. Corner sections of doors, approximately 8 by 10-inches, with door faces and edges representing actual materials to be used.

- a. Provide Samples for each species of veneer and solid lumber required.
  - b. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.
3. Frames for light openings, 6-inches long, for each material, type, and finish required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4-inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01-inch in a 3-inch span.
  2. Warranty Period for Solid-Core Interior Doors: Life of installation.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Algoma Hardwoods, Inc.
  2. Eggers Industries.
  3. General Veneer Manufacturing Co.
  4. Graham Wood Doors; an Assa Abloy Group company.
  5. Marshfield Door Systems, Inc.
  6. Mohawk Doors; a Masonite company.
  7. Oshkosh Door Company.
  8. VT Industries, Inc.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

## 2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Standards."
1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- C. WDMA I.S.1-A Performance Grade: Heavy-Duty.
- D. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2, made with binder containing no urea-formaldehyde.
  2. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
  3. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
  4. Provide doors with glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
    - a. Screw Withdrawal, Face: 700 lbf (3100 N).
    - b. Screw Withdrawal, Edge: 400 lbf (1780 N).



## F. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
  - a. Screw-Holding Capability: 550 lbf (2440 N) per WDMA T.M.-10.

## 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

## A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: White Birch.
3. Cut: Rotary cut.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Center Balance match.
6. Pair and Set Match: Provide for doors hung in same opening.
7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
8. Exposed Vertical Edges: Same species as faces or a compatible species - edge Type A.
9. Core: Particleboard.
10. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
11. WDMA I.S.1-A Performance Grade: Heavy-Duty.

## 2.4 LIGHT FRAMES

## A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.

## 2.5 FABRICATION

## A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
  - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  - 2. Metal Astragals: Factory machine astragals and formed-steel edges where this hardware is indicated in Section 087100 "Door Hardware".
- C. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
  - 1. Grade: Premium.
  - 2. Finish: WDMA TR-6 catalyzed polyurethane.
  - 3. Staining: As selected by the Architect.
  - 4. Effect: Open-grain finish.
  - 5. Sheen: Satin.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  - 1. Clearances: Provide 1/8-inch at heads, jambs, and between pairs of doors. Provide 1/8-inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4-inch from bottom of door to top of threshold unless otherwise indicated.
  - 2. Bevel non-fire-rated doors 1/8-inch in 2-inches (3-1/2 degrees) at lock and hinge edges.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

### 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

## SECTION 083113 - ACCESS DOORS AND FRAMES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.
- B. Related Requirements:
  - 1. Section 042200 - "Concrete Unit Masonry" for access doors and frames located within CMU walls
  - 2. Section 083119 - "Security Access Doors and Frames" for access doors and frames for security applications.
  - 3. Section 087100 - "Door Hardware" for access door lock cylinders.
  - 4. Section 092216 - "Non-Structural Metal Framing" for access panels in metal stud gypsum board walls.
  - 5. Section 092900 - "Gypsum Board" for access panels in metal stud gypsum board walls.
  - 6. Section 233300 - "Air Duct Accessories" for heating and air-conditioning duct access doors.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Detail fabrication and installation of access doors and frames for each type of substrate.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the

following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

## 2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

### A. Flush Access Doors with Exposed Flanges:

1. Basis-of-Design Product: Subject to compliance with requirements, provide "Architectural Access Door BNT" as manufactured by Babcock-Davis or a comparable product by one of the following:
  - a. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
  - b. Karp Associates, Inc.
  - c. Larsen's Manufacturing Company.
  - d. Milcor Inc.
  - e. Nystrom, Inc.
2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: As indicated on drawings and all locations required to access operable mechanical/plumbing controls.
4. Door Size: 24-inches x 32-inches, unless otherwise noted.
5. Uncoated Steel Sheet for Door: Nominal 0.063-inch (16 gage).
6. Finish: Paintable white powder coat (Steel).
7. Frame Material: Same material, thickness, and finish as door.
8. Hinges: Concealed spring button, manufacturer's standard.
9. Pan Depth: 1/2-inch.
10. Latch and Lock: Latch bolt, key operated. Lock prepared for cylinder specified in Section 087100 "Door Hardware."
11. Options: Masonry anchors at CMU walls.

## 2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- D. Frame Anchors: Same type as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

## 2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  - 1. Provide mounting holes in frames for attachment of units to metal or wood framing.
  - 2. Provide mounting holes in frame for attachment of masonry anchors.
- D. Latch and Lock Hardware:
  - 1. Quantity: Furnish number of locks required to hold doors tightly closed.
  - 2. Keys: Furnish two keys per lock and key all locks alike.
  - 3. Mortise Cylinder: Where indicated, provide access door lock to accept cylinder specified in Section 087100 "Door Hardware."

## 2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
  - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

### 3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

## SECTION 083119 - SECURITY ACCESS DOORS AND FRAMES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes security access doors and frames for walls.
- B. Related Requirements:
  - 1. Section 042200 – “Concrete Unit Masonry” – for access doors located in CMU walls for secure applications.
  - 2. Section 050553 - “Security Metal Fastenings” - for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 3. Section 083113 - "Access Doors and Frames" - for access doors and frames for non-secure applications.
  - 4. Section 087163 "Detention Door Hardware" - for security access door locks.
  - 5. Section 095753 "Security Ceiling Assemblies" - for access doors located in security metal ceilings.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, materials, individual components and profiles, and finishes.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Detail fabrication and installation of access doors and frames for each type of substrate.

## PART 2 - PRODUCTS

## 2.1 SECURITY ACCESS DOORS AND FRAMES

- A. Maximum-Security Flush Access Doors:



1. Basis-of-Design Product: Subject to compliance with requirements provide "Model TS Series" manufactured by Nystrom Building Products or a comparable product by one of the following:
    - a. Babcock-Davis.
    - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
    - c. Larsen's Manufacturing Company.
    - d. Norix Group.
    - e. Southern Folger Detention Equipment.
  2. Locations: Concrete masonry walls and security ceiling assemblies.
  3. Door Size: Reference drawings.
    - a. Door Size 1: Custom 24-inches wide by 32-inches high.
    - b. Door Size 2: Custom 32-inches wide by 40-inches high.
    - c. Ceiling Door Size: 24-inches wide by 24-inches long.
  4. Uncoated Steel Sheet for Door: Nominal 0.183-inch 7 gage steel
  5. Frame: 7 gage with 3/16-by-2-by-2-by-3-inch steel angle welded with joints ground smooth.
  6. Finish: Phosphate dipped with factory applied prime coat.
  7. Hinges: Heavy-duty steel welded to door and frame.
  8. Latch and Lock: Door prepared for latch and lock furnished and specified in Section 087163 "Detention Door Hardware".
  9. Warranty: One (1) year.
- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

## 2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Frame Anchors: Masonry type.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

## 2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- D. Latch and Lock Hardware:
  - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
  - 2. Keys: Furnish two keys per lock and key all locks alike.
  - 3. Lock Preparation: Prepare door panel to accept lock specified in Section 087163 "Detention Door Hardware".

## 2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
  - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083119

## SECTION 083323 - OVERHEAD COILING DOORS

## 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. Insulated heavy-duty exterior coiling doors.
  - 2. Fire-rated interior coiling doors.

- B. Related Requirements:

- 1. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 2. Section 055000 - "Metal Fabrications" for miscellaneous steel supports and equipment enclosures.
  - 3. Division 16 - "Electrical" for electrical service and connections for powered operators and accessories.
  - 4. Section 284619 - "PLC Electronic Detention Monitoring and Control Systems" for remote touch-screen coiling door controls.

## 1.3 COORDINATION

- A. Door Controls: Coordinate electrical requirements and operational requirements with Division 28 Security Systems Contractor.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.

- 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

- 1. Include plans, elevations, sections, and mounting details.

2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
  3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
  4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
  5. Include diagrams for power, signal, and control wiring.
- C. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
1. Bottom bar with sensor edge.
  2. Guides.
  3. Brackets.
  4. Hood.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
  1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. 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 as close to neutral pressure as possible according to NFPA 252 or UL 10B.
  1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
  2. Temperature-Rise Limit: At exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

3. Smoke Control: In corridors and smoke barriers, provide doors that are listed and labeled with the letter "S" on the fire-rating label by a qualified testing agency for smoke- and draft-control based on testing according to UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. of door opening at 0.10-inch wg for both ambient and elevated temperature tests.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: Three (3) years or 20,000 cycles, whichever occurs first from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
  1. Obtain operators and controls from overhead coiling door manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the code required design loads and the following:
  1. Design Wind Load: As required by ASCE 7 and criteria set forth in General Notes on Structural Drawings (Minimum 20 psf).
    - a. Basic Wind Speed: 120 mph.
    - b. Importance Factor: 1.25.
    - c. Exposure Category: C.
  2. As required by ASCE 7 and criteria set forth in General Notes on the Structural Drawings.
  3. Testing: According to ASTM E 330.
  4. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
  5. Operability under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa) wind load, acting inward and outward.

### 2.3 DOOR ASSEMBLY:

- A. Insulated Overhead Coiling Door: Overhead coiling door formed with curtain of interlocking metal slats.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Series 625 StormTite Insulated Rolling Door" as manufactured by Overhead Door Company or comparable product by one of the following:
    - a. Cookson Company.
    - b. Cornell Iron Works, Inc.
    - c. Wayne-Dalton Corp.
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Duty Cycle: Accommodated heavy usage, up to 60 cycles per hour under a large constant load.
- D. Air Infiltration: Maximum rate of 1.0 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.
- E. Curtain R-Value: 7.7; U-Value 0.13.
- F. Door Curtain Material:
  - 1. Front Slat: 20-gage galvanized steel.
  - 2. Back Slat: 22-gage galvanized steel.
- G. Door Curtain Slats:
  - 1. Flat profile slats of 2-5/8-inch center-to-center height.
  - 2. Door thickness: 3/4-inches.
- H. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8-inch thick; fabricated from hot-dip galvanized steel with vinyl weatherseal and finished to match door.
- I. Curtain Jamb Guides: Three galvanized structural steel angles with exposed finish matching curtain slats.
- J. Weatherseals:
  - 1. Vinyl bottom seal, exterior guide and internal hood seals.
  - 2. Interior guide weatherseal.
  - 3. Lintel weatherseal.
  - 4. Air infiltration perimeter seal package includes guide cover, guide cap, dual brush exterior guide seal, 4-inch finned lintel brush seal and vinyl bottom seal.
- K. Security Metal Hood: Enclosure: Provide a secure metal shroud for concealment of door operator and emergency chain hoist with a locked access door.

- L. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03-inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
- M. Locking Devices: The power operator for these doors shall prevent the doors from opening without power, except when the manual chain operator is engaged.
- N. Electric Door Operator:
  - 1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
  - 2. Operator Location: Front of hood.
  - 3. Include an input-output module plug-in board inside the motor operator with terminals that can monitor door position open or closed.
  - 4. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed.
  - 5. Motor Exposure: Exterior, wet, and humid.
  - 6. Emergency Manual Operation: Chain type. Chain to be stored in security hood enclosure with locked access door.
  - 7. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
    - a. Sensor Edge Bulb Color: As selected by Architect from manufacturer's full range.
  - 8. Control Station: Remote Control Station in Master Control 1016 by touch screen control panel provided by Division 28. Touch screen to simulate momentary-contact push button controls labeled "Open" and "Stop" and sustained or constant-pressure push-button control labeled "Close".
  - 9. Curtain Accessories: Equip door with weatherseals.
- O. Door Finish:
  - 1. Baked-Enamel or Powder-Coated Finish: Custom color to match adjacent sectional doors finish.
  - 2. Interior Curtain-Slat Facing: Color as selected by Architect from manufacturer's full range.
  - 3. Factory Prime Finish: Color as selected by Architect from manufacturer's full range.

## 2.4 FIRE-RATED SERVICE DOOR ASSEMBLY

- A. Interior Fire-rated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
  - 1. Basis-of-Design Product: Provide "FireKing Model 631" Fire-rated Rolling Service Door or comparable product by one of the following:
    - a. Cookson Company.
    - b. Cornell Iron Works, Inc.
    - c. Wayne-Dalton Corp.



- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
  - 1. Include tamperproof cycle counter.
- C. Fire Rating: 1-hour with temperature-rise limit and with smoke control.
- D. Door Curtain Material: 24-gage galvanized steel.
- E. Door Curtain Slats: Interlocking roll-formed flat profile slats of 2-5/8-inch center-to-center height.
  - 1. Gasket Seal: Manufacturer's standard continuous gaskets between slats.
  - 2. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
- F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8-inch thick; fabricated from hot-dip galvanized steel.
- G. Curtain Jamb Guides: Roll-formed galvanized steel shapes attached to continuous steel wall angle with exposed finish matching curtain slats.
  - 1. Fastening Guides to Masonry Fire Walls: UL listed for fire and smoke in accordance with manufacturer's listing.
- H. Hood:
  - 1. 24 gage primed steel (interior mount).
  - 2. Aluminum hood with intermediate supports (exterior mount).
  - 3. Shape: Semi-Round
  - 4. Mounting: As shown on Drawings.
- I. Locking Devices: The power operator for these doors shall prevent the doors from opening without power, except when the manual crank operator is engaged.
- J. Security Metal Enclosure: Provide a metal shroud for concealment of door operator and emergency chain hoist with a locked access door at all coiling doors located within the secured perimeter.
  - 1. Material: A factory-fabricated steel cover support system with concealed surface-mounted attachment clamps.
  - 2. Cover essentially irremovable with the use of ordinary tools.
  - 3. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install formed metal cover system.
  - 4. Emergency Manual Operation: Crank type.
  - 5. Automatic Closure: Provide automatic closure thermally controlled by means of 165 degree fusible links. Operating mechanism shall be disengaged during automatic closing. Automatic closing rate shall be controlled by a governor.

- a. Time Delay Release Device: UL 864 rated; Fire Sentinel. Provide UL/FM fail safe release device.
  - 6. Wall Mounting Condition: Face-of-wall mounting.
  - 7. Obstruction-Detection Device: Sensing edge protection.
    - a. Electric sensing edge.
  - 8. Control Station: Touch screen control station by Division 28 located in Master Control Room. Touch screen to simulate momentary-contact push button controls labeled "Open" and "Stop" and sustained or constant-pressure push-button control labeled "Close".
- K. Closing Mechanism: Time delay release device.
- 1. Basis-of-Design Product: Subject to compliance, provide "Model B2" by Fire Sentinel or comparable product.
  - 2. Description:
    - a. Provides a 10 second delay on alarm signal and a 10-second delay or power loss to activate closure of fire door.
    - b. Battery backup which provides power and up to four (4) smoke detectors for up to 72 hours during power loss.
  - 3. Fire doors with release devices controlled by smoke detectors need special consideration if the fire door does not stay open all the time, because the fire door closing mechanism can be damaged if the fire door is closed when the release device is released by power failure. You can prevent this problem by the specified B2 Model which has the fail-safe release device with battery power supply that will provide power to the smoke detectors and the release device during power failure.
- L. Curtain Accessories: Equip door with smoke seals and weather seals at non-tempered areas.
- M. Door Finish:
- 1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range
  - 2. Factory Prime Finish: Manufacturer's standard color.
  - 3. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face as selected by Architect from manufacturer's full range.

## 2.5 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.6 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028-inch; and as required.
  2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
  3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010-inch.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading.

Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

## 2.7 SECURITY METAL HOOD ENCLOSURES

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods. Equip hood with intermediate support brackets as required to prevent sagging.
1. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M.
  2. Shape: Sloped.
  3. Mounting: Face of wall.
  4. Provide a secure metal shroud for concealment of door operator and emergency chain hoist.
  5. Hood Access Door: Provide access door with lockset in bottom of the hood to access concealed emergency chain. Lockset shall be keyed to the building keying system.
  6. Secure cover with security fasteners.

## 2.8 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
  - 1. At door head, use 1/8-inch-thick, replaceable, continuous-sheet baffle secured to inside of hood or field- installed on the header.
  - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene.

## 2.9 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

## 2.10 ELECTRIC DOOR OPERATORS

- A. General: Heavy-duty electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Chamberlain Group, Inc. (The).
    - b. LiftMaster.

- c. Overhead Door Company.
  - 2. Electric Motor Rating: UL listed;
  - 3. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
  - 4. Operator Location: Front of hood.
  - 5. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower
  - 6. Emergency Manual Operation: Chain type.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
  - 1. Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
- C. Door Operator Location(s): Front of hood.
  - 1. Motor Exposure: Exterior, wet and humid.
- D. Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
  - 1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
  - 2. Electrical Motor Characteristics:
    - a. Size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
    - b. Phase: 1/2 HP, Single phase; NEMA 48.
    - c. Volts: 120V.
    - d. Hertz: 60.
  - 3. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
  - 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
  - 1. Provide additional contacts as needed for remote door control system.
- F. Obstruction-Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protection full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

1. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to the bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
- G. Remote Control Station: Touch screen control station by Division 28 located in Master Control Room. Touch screen to simulate momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
- H. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual emergency chain hoist operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism inside the security metal hood enclosure near the locked hood access door so that it is not accessible to inmates. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- I. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

#### 2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

#### 2.12 STEEL AND GALVANIZED FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's custom baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application and minimum dry film thickness.

#### 2.13 FABRICATION, GENERAL

- A. Form manufactured metal covers from metal of type and thickness indicated below. Coordinate size of covers, location of cutouts for equipment access and method of attachment to adjoining construction.
  1. Galvanized Steel Sheet: 0.079-inch (14 gage).
    - a. Finish: Factory primed with paint-grip primer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

#### 3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

#### 3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
  - 1. Adjust exterior doors and components to be weather-resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323



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## SECTION 083463 - DETENTION DOORS AND FRAMES

## 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. Swinging detention doors.
- 2. Sliding detention doors.
- 3. Detention frames.

## B. Related Requirements:

- 1. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
- 2. Section 087163 - "Detention Door Hardware" for door hardware for detention doors.
- 3. Section 135500 - "Prefabricated Modular Steel Cells" for detention doors and frames included with modular steel cells.
- 4. Section 285123 - "Audio Communications System" for intercom stations mounted in detention frames.

## 1.3 DEFINITIONS

- A. Minimum-Thickness Steel: Indicated as the specified minimum thicknesses for base metal without coatings, according to NAAMM-HMMA 803.
- B. Nominal-Thickness Stainless Steel: Indicated as the specified thicknesses for which over- and under-thickness tolerances apply, according to ASTM A 480/A 480M.

## 1.4 COORDINATION

- A. Coordinate anchorage installation for detention frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

## 1.5 PREINSTALLATION MEETINGS

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

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, temperature-rise ratings, and finishes for each detention door and frame type specified.
- B. Shop Drawings: In addition to requirements below, provide a schedule using same reference numbers for details and openings as those on Drawings:
  - 1. Elevations of each door type.
  - 2. Direction of swing or slide.
  - 3. Inmate and non-inmate sides.
  - 4. Details of doors, including vertical and horizontal edge details, and metal thicknesses.
  - 5. Details of frames, including dimensioned profiles, and metal thicknesses.
  - 6. Locations of reinforcement and preparations for hardware.
  - 7. Details of each different wall opening condition.
  - 8. Details of anchorages, joints, field splices, and connections.
  - 9. Details of food-pass openings and detention louvers.
  - 10. Details of moldings, removable stops, and glazing.
  - 11. Details of conduits, junction boxes, and preparations for electrically operated door hardware.
- C. Samples for Verification:
  - 1. For "Detention Doors" and "Detention Frames" subparagraphs below, prepare Samples approximately 12 by 12-inches to demonstrate compliance with requirements for quality of materials and construction:
    - a. Detention Doors: Show vertical-edge, top, and bottom construction; insulation; face stiffeners; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
    - b. Detention Frames: Show profile, welded corner joint, welded hinge reinforcement, grout-cover boxes, floor and wall anchors, and silencers. Include separate section showing fixed steel panels and glazing if applicable.

## 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Welding certificates.

- C. Product Test Reports: For each type of detention hollow-metal door and frame assembly including vision and side lights, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Examination reports documenting inspection of substrates, areas, and conditions.
- E. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
- F. Field quality-control reports documenting inspections of installed products.
  - 1. Field quality-control certification signed by Construction Manager and Detention Equipment Contractor.
- G. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.

#### 1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
  - 2. Tools: Provide two sets of tools for installing and removing security fasteners.

#### 1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
  - 2. AWS D1.3, "Structural Welding Code - Sheet Steel".
  - 3. AWS D1.6, "Structural Welding Code - Stainless Steel".

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver detention hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
- B. Deliver welded detention frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store detention hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain detention doors and frames from single source from single manufacturer. Basis-of-Design Product: Trussbilt, Inc. or comparable product by one of the following:
1. American Steel Products
  2. Apex Industries.
  3. Slate Security Systems, Inc.
  4. Titan Steel Door, LLC.

### 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke-and-Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
  2. Oversize Fire-Rated Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

### 2.3 DETENTION DOOR AND FRAME ASSEMBLIES

- A. Detention Door and Frame Assemblies: Provide detention door and frame assemblies that comply with the following, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project:
1. Security Grade: Assemblies pass testing requirements in ASTM F 1450 for security grades specified.
  2. Tool-Attack Resistance: Small-tool-attack-resistance rated when tested according to UL 437 and UL 1034.
- B. Detention Frames: Provide sidelight and borrowed-light detention frames that comply with ASTM F 1592 and removable stop test according to NAAMM-HMMA 863, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

## 2.4 DETENTION DOORS

- A. General: Provide flush-design detention doors of seamless hollow construction, 2-inches thick unless otherwise indicated. Construct detention doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges.
  - 1. For single-acting swinging detention doors, bevel both vertical edges 1/8-inch in 2-inches.
  - 2. For sliding detention doors, square both vertical edges.
- B. Core Construction: Provide the following core construction of same material as detention door face sheets, welded to both detention door faces:
  - 1. Steel-Stiffened Core: 0.042-inch (18-gage) thick, steel vertical stiffeners extending full-door height, with vertical webs spaced not more than 4-inches apart, spot welded to face sheets a maximum of 3-inches o.c. Fill spaces between stiffeners with insulation.
  - 2. Truss-Stiffened Core: 0.013-inch thick, steel, truncated triangular stiffeners extending between face sheets and for full height and width of door; with stiffeners welded to face sheets not more than 3-inches o.c. vertically and 2-3/4-inches horizontally. Fill spaces between stiffeners with insulation.
- C. Vertical Edge Channels: 0.123-inch (10-gage) thick, continuous channel of same material as detention door face sheets, extending full-door height at each vertical edge; welded to top and bottom channels to create a fully welded perimeter channel. Noncontiguous channel is permitted to accommodate lock-edge hardware only if lock reinforcement is welded to and made integral with channel.
- D. Top and Bottom Channels: 0.123-inch (10-gage) thick metal channel of same material as detention door face sheets, spot welded, not more than 4-inches o.c., to face sheets.
  - 1. Reinforce top edge of detention door with 0.053-inch thick closing channel, welded so channel web is flush with top door edges.
- E. Hardware Reinforcement: Fabricate reinforcing plates from same material as detention door face sheets to comply with the following minimum thicknesses:
  - 1. Full-Mortise Hinges and Pivots: 0.187-inch thick.
  - 2. Maximum-Security Surface Hinges: 0.250-inch thick.
  - 3. Strike Reinforcements: 0.187-inch thick.
  - 4. Slide-Device Hanger Attachments: As recommended by device manufacturer.
  - 5. Lock Fronts, Concealed Holders, and Surface-Mounted Closers: 0.093-inch (12-gage) thick.
  - 6. All Other Surface-Mounted Hardware: 0.093-inch (12-gage) thick.
  - 7. Lock Pockets: 0.123-inch (10-gage) thick at non-inmate side, welded to face sheet.
- F. Hardware Enclosures: Provide enclosures and junction boxes for electrically operated detention door hardware of same material as detention door face sheets, interconnected with UL-approved, 1/2-inch-diameter conduit and connectors.

1. Access Plates: Where indicated for wiring installation, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least four security fasteners spaced not more than 6-inches o.c.
- G. Interior Detention Doors: Construct interior doors to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.
  1. Security Grade 1: Provide doors with face sheets of 0.093-inch (12-gage)-minimum thickness, cold-rolled steel.
- H. Exterior Detention Doors and Interior Doors at Vehicular Sallyport: Construct exterior doors to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.
  1. Security Grade 1: Provide doors with face sheets of 0.093-inch (12-gage)-minimum thickness, metallic-coated, cold-rolled steel.

## 2.5 DETENTION FRAMES

- A. General: Provide fully welded detention frames with integral stops, of seamless construction without visible joints or seams. Fabricate detention frames with contact edges closed tight and corners mitered, reinforced, and continuously welded full depth and width of detention frame.
- B. Stop Height: Provide minimum stop height of 0.625-inch for detention door openings and minimum stop height of 1-1/4-inches in security glazing or detention panel openings unless otherwise indicated.
- C. Interior Detention Frames: Construct interior frames to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.
  1. Security Grade 1: Provide frames fabricated from 0.093-inch (12-gage)-minimum thickness, cold-rolled steel.
- D. Exterior Detention Frames and Interior Frames at Vehicular Sallyport: Construct exterior frames to comply with materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances indicated in NAAMM-HMMA 863 and as specified.
  1. Security Grade 1: Provide frames fabricated from 0.093-inch (12-gage)-minimum thickness, metallic-coated, cold-rolled steel].
- E. Hardware Reinforcement: Fabricate reinforcing plates from same material as detention frame to comply with the following minimum thicknesses:
  1. Hinges and Pivots: 0.187-inch thick by 1-1/2-inches wide by 10-inches long.
  2. Strikes, Flush Bolts, and Closers: 0.187-inch thick.
  3. Surface-Mounted Hardware: 0.093-inch thick.

4. Lock Pockets: 0.123-inch thick at non-inmate side, welded to face sheet. Provide 0.123-inch thick, lock protection plate for attachment to lock pocket with security fasteners.
- F. Hardware Enclosures: Provide enclosures and junction boxes for electrically operated detention door hardware, interconnected with UL-approved, 1/2-inch diameter conduit and connectors.
1. Access Plates: Where indicated for wiring installation, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least four security fasteners spaced not more than 6-inches o.c.
- G. Mullions and Transom Bars: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between detention frame members with concealed clip angles or sleeves of same metal and thickness as detention frame.
- H. Jamb Anchors: Weld jamb anchors to detention frames near hinges and directly opposite on strike jamb or as required to secure detention frames to adjacent construction.
1. Number of Anchors: Provide two anchors per jamb plus the following:
    - a. Detention Door Frames: One additional anchor for each 18-inches, or fraction thereof, above 54-inches in height.
    - b. Detention Frames with Security Glazing or Detention Panels: One additional anchor for each 18-inches, or fraction thereof, above 36-inches in height.
  2. Masonry Anchors: Adjustable, corrugated or perforated anchors to suit detention frame size; formed of same material and thickness as detention frame; with strap, not less than 2-inches wide by 10-inches long.
  3. Post-installed Anchors: Minimum 1/2-inch diameter concealed bolts with countersunk head and expansion shields or inserts. Provide 10-gage steel tube spacer from detention frame to wall, welded to detention frame. Reinforce detention frame at anchor locations with 12-gage steel backup plate.
- I. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material and thickness as detention frame, and as follows:
1. Monolithic Concrete Slabs: Clip anchors, with two holes to receive fasteners, welded to bottom of jambs and mullions with at least four spot welds per anchor.
- J. Rubber Door Silencers: Except on weather-stripped detention doors, drill stops in strike jambs to receive three silencers on single-detention-door frames and drill head jamb stop to receive two silencers on double-detention-door frames. Keep holes clear during construction.
- K. Grout Guards: Provide factory-installed grout guards of same material as detention frame, welded to detention frame at back of hardware cutouts, silencers, and glazing-stop screw preparations to close off interior of openings and prevent mortar or other materials from obstructing hardware operation or installation.



## 2.6 DETENTION PANELS

- A. Provide fixed 3/16-inch (7-gauge) steel plate detention infill panels above ceiling line at non-fire-rated frames where shown on the drawings.
- B. Provide fixed detention panels of same materials, construction, and finish as specified for adjoining detention door above ceiling line at fire-rated frames and where shown on the drawings.

## 2.7 MOLDINGS AND STOPS

- A. Provide fixed moldings on inmate side of glazed openings and removable stops on non-inmate side.
  - 1. Height: As required to provide minimum 1-inch glass engagement, but not less than 1-1/4-inches.
  - 2. Fixed Moldings: Formed from same material as detention door and frame face sheets, but not less than 0.093-inch (12 gage) thick, and spot welded to face sheets a maximum of 5-inches o.c.
  - 3. Removable Stops: Formed from 0.123-inch (10 gage) thick angle, of same material as detention door face sheets. Secure with button head security fasteners spaced uniformly not more than 9-inches o.c. and not more than 2-inches from each corner, and as necessary to satisfy performance requirements. Form corners with notched or mitered hairline joints.
- B. Coordinate rabbet width between fixed and removable stops with glass or panel type and installation type indicated.

## 2.8 MATERIALS

- A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, CS (Commercial Steel), Type B; with G60 zinc (galvanized) or A60 zinc-iron-alloy (galvannealed) coating designation.
- D. Stainless-Steel Sheet: ASTM A 240/A 240M, austenitic stainless steel, Type 304.
- E. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- F. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- G. Masonry Anchors: Fabricated from same steel sheet as door face.
- H. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- I. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - J. Glazing: Comply with Section 088853 "Security Glazing".
  - K. Grout: Comply with ASTM C 476, with a slump of not more than 4-inches as measured according to ASTM C 143/C 143M.
  - L. Insulation: Slag-wool-fiber/rock-wool-fiber or glass-fiber blanket insulation. ASTM C 665, Type I (unfaced); with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Minimum 1.5-lb/cu. ft. density.
  - M. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
    1. Other protective coatings must be submitted to the Architect prior to bidding for consideration by the Architect.

## 2.9 FABRICATION

- A. Fabricate detention doors and frames rigid, neat in appearance, and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate detention doors and frames to comply with manufacturing tolerances indicated in NAAMM-HMMA 863.
- C. Removable Jamb Faces: Provide removable jamb faces where required for access to embedded anchors. Fabricate to allow secure reattachment of removable face with security fasteners.
- D. Fabricate multiple-opening detention frames with mullions that have closed tubular shapes and with no visible seams or joints.
- E. Exterior Detention Doors: Provide weep-hole openings in bottoms of detention doors to permit entrapped moisture to escape. Seal joints in top edges of detention doors against water penetration.

- F. Hardware Preparation: Factory prepare detention doors and frames to receive mortised hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final Door Hardware Schedule and templates provided by detention door hardware supplier.
  - 1. Reinforce detention doors and frames to receive surface-mounted door hardware. Drilling and tapping may be done at Project site.
  - 2. Locate door hardware according to NAAMM-HMMA 863.
- G. Factory cut openings in detention doors.
- H. Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

## 2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish detention doors and frames after assembly.

## 2.11 METALLIC-COATED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A 780.
- B. Factory Priming for Field-Painted Finish: Apply shop primer specified in "Shop Primer" Subparagraph below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mil.
  - 1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10 acceptance criteria; recommended by primer manufacturer for zinc-coated steel; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

## 2.12 STEEL SHEET FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling".
- B. Factory Priming for Field-Painted Finish: Apply shop primer specified in "Shop Primer" Subparagraph below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mil.

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with SDI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

## 2.13 SEALANTS

- A. Polyurethane Security Sealants: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement.
  1. Manufacturers: Subject to compliance with requirements, provide products by the following or a comparable product:
    - a. Pecora Corporation; "DynaFlex".
- B. Epoxy Security Sealants: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with no movement.
  1. Manufacturers: Subject to compliance with requirements, provide products by the following or a comparable product:
    - a. Pecora Corporation; "DynaPoxy EP-1200".

## 2.14 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16-inch thick; with minimum 1/2-inch diameter, headed studs welded to back of plate.
- C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- D. Pass-Through Openings: Fabricate flush openings using 0.093-inch-thick interior channels of same material as detention door faces, inverted to be flush with openings, welded to inside of both face sheets and with corners fully welded. Mount shutters at edge of door on non-inmate side of detention doors. Reinforce door edge of door cutout, locks and food-pass hinges.
  1. Overlapping Shutters: For surface application on non-inmate side of door. Fabricate from a single steel plate, of same material as detention door face sheets, 0.187-inch-thick, sized to overlap food-pass openings 1/2-inch.
- E. Detention Door Louvers: Fabricate flush louver openings using 0.093-inch-thick, interior steel channels of same material as detention door faces, welded to inside of both detention door face sheets and with corners fully welded. Provide welded, inverted V-shaped vanes allowing specified airflow, fabricated from same material as detention door face sheets, 0.093-inch thick, and spaced so no rigid flat instrument can pass through.

1. Reinforcement: Reinforce louvers that exceed 18 inches in height at louver midpoint with 1/4-by-1-1/2-inch-square, vertical rectangular steel bar or 3/4-inch-diameter, vertical steel bar.
  2. Airflow: 230 cfm and static-pressure loss 0.03-inch wg.
- F. Mount detention intercom stations specified in Section 285123 "Audio Communications System" in 8-inches lock jambs of detention frames where indicated on Security Electronics drawings.

### PART 3 - EXECUTION

#### 3.1 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. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention frame connections before detention frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Inspect embedded plate installations before installing detention frames to verify that plate installations comply with requirements. Prepare inspection reports.
  1. Remove and replace plates where inspections indicate that they do not comply with specified requirements. Re-inspect after repairs or replacements are made.
  2. Perform additional inspections to determine compliance of replaced or additional work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory.
- B. Before installation and with shipping spreaders removed, adjust detention frames for squareness, alignment, twist, and plumbness to the following tolerances:
  1. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb and perpendicular to frame head.
  2. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of face.
  3. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of door rabbet.

4. Plumbness: Plus or minus 1/16-inch, measured at jambs on a perpendicular line from head to floor.

### 3.3 INSTALLATION

- A. General: Install detention doors and frames plumb, rigid, properly aligned, and securely fastened in place, complying with Drawings, schedules, and manufacturer's written recommendations.
- B. Anchorage: Set detention frame anchorage devices according to details on Shop Drawings and according to anchorage device manufacturer's written instructions.
  1. Masonry Anchors: Coordinate frame installation to allow for solidly filling space between frames and masonry with grout.
  2. Post-installed Anchors: Drill holes in existing construction at locations to match bolt locations, and install bolt expansion shields or inserts. Field weld bolt heads and grind exposed faces smooth after installation.
- C. Where detention frames are fabricated in sections due to shipping limitations, assemble frames and install angle splices at each corner, of same material and thickness as detention frame, and extend at least 4-inches on both sides of joint.
  1. Field splice only at approved locations. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
  2. Continuously weld and finish smooth joints between faces of abutted, multiple-opening, detention frame members.
  3. Field Welding: Comply with the following requirements:
    - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    - b. Obtain fusion without undercut or overlap.
    - c. Remove welding flux immediately.
    - d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Placing Detention Frames: Install detention frames of sizes and profiles indicated. Set detention frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
  1. Embedded Anchors: Remove jamb faces from detention frames and set detention frames into opening. Weld steel connector angle to frame angle and to embedded plate with 1-inch-long welds at each end of connector angle to form a rigid frame assembly that is solidly anchored. Reinstall jamb faces using security fasteners.
  2. Post-installed Anchors: Install bolt. After bolt is tightened, weld bolt head to provide nonremovable condition. Grind, dress, and finish smooth welded bolt head.
  3. At fire-rated openings, install detention frames according to NFPA 80.

4. Install detention frames with removable stops located on non-inmate side of opening.
- E. Grout: Fully grout detention frame jambs and heads. Completely fill space between frames and adjacent substrates. Hand trowel grout and take other precautions, including bracing detention frames, to ensure that frames are not deformed or damaged by grout forces.
  1. Apply bituminous coating to backs of frames before filling with grout. Protective coating may be shop applied or field applied.
- F. Security Sealant: Apply epoxy security sealant at all exposed gaps between detention frames and adjacent substrates.
- G. Swinging Detention Doors: Fit non-fire-rated detention doors accurately in their frames, with the following clearances:
  1. Between Doors and Frames at Jambs and Head: 1/8-inch.
  2. Between Edges of Pairs of Doors: 1/8-inch.
  3. At Door Sills with Threshold: 3/8-inch.
  4. At Door Sills without Threshold: 3/4-inch.
  5. Between Door Bottom and Nominal Surface of Floor Covering: 1/2-inch.
- H. Sliding Detention Doors: Fit sliding detention doors in their frames according to manufacturer's written instructions and as required to allow doors to slide without binding.
- I. Fire-Rated Detention Doors: Install with clearances as specified in NFPA 80.
- J. Smoke-Control Detention Doors: Install according to NFPA 105.
- K. Installation Tolerances: Comply with installation tolerances indicated in NAAMM-HMMA 863.
- L. Glazing: Comply with installation requirements in Section 088853 "Security Glazing" unless otherwise indicated.

### 3.4 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Detention work will be considered defective if it does not pass tests and inspections.
- C. Perform additional inspections to determine compliance of replaced or additional work.
- D. Prepare field quality-control certification endorsed by Detention Specialist that states installed products comply with requirements in the Contract Documents.
- E. Prepare test and inspection reports.

### 3.5 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 detention doors and frames that are warped, bowed, or otherwise unacceptable.
- B. Clean grout and other bonding material off detention doors and frames immediately after installation.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780.
- D. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
  - 1. After finishing smooth field welds, apply air-drying primer.

END OF SECTION 083463



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## SECTION 083613 – SECTIONAL DOORS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes electrically operated sectional overhead doors.
- B. Related Sections:
  - 1. Section 034100 – “Precast Structural Concrete” – for doors mounted on exterior precast concrete walls.
  - 2. Section 050553 - “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 3. Section 055000 - "Metal Fabrications" for miscellaneous steel supports and equipment enclosures.
  - 4. Division 26 Sections for electrical service and connections for powered operators, door position switches and accessories.

## 1.3 COORDINATION

- A. Door Controls: Coordinate electrical requirements and provide necessary contacts for operational requirements for Division 28 Security Systems Contractor.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional overhead door and accessory.
  - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
  - 1. Include plans, elevations, sections, and mounting details.
  - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.

3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
  4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
  5. Include diagrams for power, signal, and control wiring.
- C. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
1. Flat door sections.
- D. Delegated-Design Submittal: For sectional doors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail fabrication and assembly of seismic restraints.
  2. Summary of forces and loads on walls and jambs.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Warranties: Sample of special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sectional doors to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Standard for Sectional Doors: Fabricate sectional doors to comply with DASMA 102 unless otherwise indicated.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sectional doors and operator systems that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
  - b. Failure of components or operators before reaching required number of operation cycles.
  - c. Faulty operation of hardware.
  - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
  - e. Delamination of exterior or interior facing materials.
2. Warranty Period:
  - a. Ten (10) years from date of Substantial Completion for delamination of polyurethane foam from the steel skin.
  - b. Three (3) years on all other components.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
  1. Warranty Period: Twenty-years (20) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain sectional overhead doors from single source from single manufacturer.
  1. Obtain operators and controls from sectional overhead door manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors shall meet performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Delegated Design: Design sectional doors, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Performance: Exterior sectional doors shall withstand the effects of code required loads under conditions indicated according to ASCE/SEI 7.
  1. Wind Loads: As required by ASCE 7 and criteria set forth in General Notes, sheet S0.1 (Minimum 20 psf).
    - a. Basic Wind Speed: 120 mph.
    - b. Importance Factor: 1.25.
    - c. Exposure Category: C.

2. Testing: According to ASTM E 330 or DASMA 108 for garage doors and meeting the acceptance criteria of DASMA 108.
  3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components. Deflection of door in horizontal position (open) shall not exceed 1/120 of the door width.
  4. Operability under Wind Load: Design overhead coiling doors to remain operable under design of 20 lbf/sq. ft. wind load, acting inward and outward.
- D. Air leakage shall be determined in accordance with NFRC-400 (National Fenestration Rating Council) and shall be labeled and certified by the manufacturer per ASHRAE 90.1. Leakage shall not exceed 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
- E. Seismic Performance: Sectional doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
  2. Seismic Component Importance Factor: 1.5.
- F. Operation Cycles: Provide sectional door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

## 2.3 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Overhead Door Corporation; "Model 850 Thermacore AP Door" or comparable product by one of the following:
    - a. Clopay Building Products; a Griffon company.
    - b. Raynor.
    - c. Wayne-Dalton Corp.
- B. Operation Cycles: Not less than 50,000.
- C. Installed R-Value: 26 (4.58 Msq/W).
- D. Steel Sections: Zinc-coated (galvanized) steel sheet with G60zinc coating.
1. Section Thickness: 3-inches.
  2. Exterior-Face, Steel Sheet Thickness: 0.015-inch nominal coated thickness.
    - a. Surface: Manufacturer's standard, ribbed.
  3. Insulation: Foamed in place.

4. Interior Facing Material: Zinc-coated galvanized steel sheet of manufacturer's recommended thickness to meet performance requirements nominal coated thickness.
- E. Track Configuration: Standard-lift; 3-inch track.
- F. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.
- G. Roller-Tire Material: Manufacturer's standard.
- H. Counterbalance Type: Weight counterbalance.
- I. Door Finish:
  1. Baked-Enamel or Powder-Coated Finish: Custom color to match other exterior finishes.
  2. Finish of Interior Facing Material: Match finish of exterior section face.

## 2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.5 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Fabricate from zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.
  1. Fabricate section faces from single sheets to provide sections not more than 24-inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.
  2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48-inches apart.
- C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.
- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.

- E. Provide reinforcement for hardware attachment.
- F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections that incorporate the following interior facing material, with no exposed insulation:
  - 1. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated thickness.
- G. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

## 2.6 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.
  - 1. Galvanized Steel: ASTM A 653/A 653M, minimum G60 zinc coating.
  - 2. Slope tracks at an angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
- B. Track Reinforcement and Supports: Galvanized-steel track reinforcement and support members, complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.
  - 1. Track Assembly: Track shall be made to run vertically as high as allowed by structure, HVAC and lighting fixtures, and then turn horizontal. Track with continuous reinforcing angle attached to track and supported at points from curve in track to end of track by laterally braced attachments to overhead structural members.
    - a. For Vertical Track: Continuous reinforcing angle attached to track and attached to wall with jamb brackets.
    - b. For Horizontal Track: Continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.
- C. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.

## 2.7 HARDWARE

- A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges where required, for doors over 16 feet wide unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch diameter roller tires for 3-inch wide track.

## 2.8 LOCKING DEVICES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only. Owner will provide padlock.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

## 2.9 COUNTERBALANCE MECHANISM

- A. Weight Counterbalance: Counterbalance mechanism consisting of filled pipe weights that move vertically in a galvanized-steel weight pipe. Connect pipe weights with cable to weight-cable drums mounted on torsion shaft made of steel tube or solid steel.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet long and two additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.
- C. Cables: Galvanized-steel lifting cables with cable safety factor of at least 7 to 1.
- D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.



## 2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Comply with NFPA 70.
  - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
  - 3. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door. : Heavy-duty, 25 or more cycles per hour and more than 90 cycles per day.
- B. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
  - 1. Trolley: Trolley operator mounted to ceiling above and to rear of door in raised position and directly connected to door with drawbar.
  - 2. Jackshaft, Center Mounted: Jackshaft operator mounted on the inside front wall above door and connected to torsion shaft with an adjustable coupling or drive chain.
- C. Electric Door Operator:
  - 1. Usage Classification: Standard duty, up to 60 cycles per hour.
  - 2. Operator Type: Jackshaft, center mounted.
  - 3. Motor Exposure: Interior, clean, and dry.
  - 4. Emergency Manual Operation: Chain type.
  - 5. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
    - a. Sensor Edge Bulb Color: Black.
  - 6. Other Equipment: Provide magnetic door position switches equal to "Sentrol 2300 Series" Panel Door Magnetic contact.
  - 7. Remote Control Station: Touch screen control station by Division 28 locater in Master Control B1016. Touch screen to simulate momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
- D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements shall be as per manufacturer's recommendations for this specific installation.
  - 1. Electrical Characteristics:
    - a. Volts: 115V.
    - b. Phase: Single phase.
    - c. Hertz: 60.

2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
  3. Motor Size: Provide motor large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
    - a. Motor size not less than ½ horsepower.
  4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
  5. Use adjustable motor-mounting bases for belt-driven operators.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
1. Provide additional contacts necessary to control the door operator from the remote control panel.
- F. Control Stations: Remote control station, intent is for a vehicle to pull up to a camera-monitored intercom station outside the Vehicular Sallyport door where a request to open the door can be made to Master Control B1016. Remote controls for the sectional overhead doors will be by touch screen control panel provided by Division 28.
1. Doors shall also be controlled locally from key-operated control switch located next to the door.
- G. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- H. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- I. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- 2.11 GENERAL FINISH REQUIREMENTS
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
  - B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Custom color baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
  - 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24-inches apart.
  - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

### 3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

### 3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weathertight fit around entire perimeter.
- D. Align and adjust motors, pulleys, belts, sprockets, chains, and controls according to manufacturer's written instructions.
- E. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors. Provide instructional video tape.

END OF SECTION 083613

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## SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes:

- 1. Exterior and interior storefront framing.
- 2. Exterior and interior manual-swing entrance doors and door-frame units.
- 3. Coordinate door and frame preparation with Section 087100 "Door Hardware". Ensure proper size, thickness, hand, function, and finish of entrance door hardware.

## B. Related Requirements:

- 1. Section 079200 - "Joint Sealants" for joints at the storefront framing and adjacent material.
- 2. Section 084413 - "Glazed Aluminum Curtainwalls" for curtainwall system adjacent to storefront.
- 3. Section 087100 - Door Hardware for additional door hardware on aluminum entrance doors.
- 4. Section 088000 - "Glazing" for glass types.

## 1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

## B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

- 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
- 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
  - a. Joinery, including concealed welds.
  - b. Anchorage.

- c. Expansion provisions.
  - d. Glazing.
  - e. Flashing and drainage.
- 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Entrance Door Hardware Schedule: Prepared by or under 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.
- E. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and field-testing agency.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
  - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by a qualified testing agency.
- D. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- E. Source quality-control reports.
- F. Field quality-control reports.
- G. Sample Warranties: For special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
  - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

## 1.7 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or
- B. include workmanship within specified warranty period.
  - 1. Failures, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration created by wind and thermal and structural movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Failure of operating components.
  - 2. Warranty Period: Two (2) years from date of Substantial Completion.
- C. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking more than a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.



## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- C. Structural Performance: Aluminum-framed entrances and storefronts shall be capable of withstanding the design loads required by ASCE7 and the criteria set forth in the Design Data of the General Notes on the Structural Drawings.
- D. Structural Loads:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
- E. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Parallel to Glazing Plane: Limited to  $1/360$  of clear span or  $1/8$ -inch, whichever is smaller.
  - 2. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
    - a. Perpendicular to Plane of Wall: No greater than  $1/240$  of clear span plus  $1/4$ -inch for spans greater than 11 feet 8- $1/4$ -inches or  $1/175$  times span, for spans less than 11 feet 8- $1/4$ -inches.
- F. Structural: Test according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- G. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
  2. Entrance Doors:
    - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
    - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
- H. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- I. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
- J. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.57 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.40 as determined according to NFRC 200.
  3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 25 as determined according to NFRC 500.
- K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
  2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

- a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
- b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
- c. Interior Ambient-Air Temperature: 75 deg F.

## 2.2 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Tri-fab VersaGlaze 451/451T" aluminum framed system as manufactured by Kawneer North America or a comparable product by one of the following:
  1. CMI Architectural.
  2. EFCO Corporation.
  3. Pittco Architectural Metals, Inc.
  4. TRACO.
  5. Tubelite, Inc.
  6. U.S. Aluminum; a Brand of C.R. Laurence.
- B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront and curtain wall systems, including framing, spandrel panels, entrances and accessories, from single manufacturer.

## 2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  1. Construction: Thermally broken at exterior storefront only.
  2. Glazing System: 1-inch insulated glazing; retained mechanically with gaskets on four sides.
  3. Glazing Plane: Center.
  4. Finish: High-performance organic finish.
  5. Fabrication Method: Field-fabricated stick system.
  6. Exterior Profile Size: 2-inches by 4-1/2-inches to accept 1-inch glazing.
  7. Interior Profile Size: 2-inches by 4-1/2-inches to accept 1/4 -inch safety glazing.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
  1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209.

- b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
  - d. Structural Profiles: ASTM B 308/B 308M.
- 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
  - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
  - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
  - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

## 2.4 ENTRANCE DOOR SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "500 Wide Stile" aluminum entrance doors as manufactured by Kawneer North America or a comparable product by one of the following:
  - 1. CMI Architectural.
  - 2. EFCO Corporation.
  - 3. Pittco Architectural Metals, Inc.
  - 4. TRACO.
  - 5. Tubelite Inc.
  - 6. U.S. Aluminum; a Brand of C.R. Laurence.
- B. Door Construction: 1 3/4-inch overall thickness, with extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
- C. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
- D. Door Design:
  - 1. Wide Stile:
    - a. Vertical Stile: 5-inches.
    - b. Top Rail: 5-inches.
    - c. Bottom rail: 10-inches to comply with ADA.
  - 2. Major portions of the door members to be 0.188-inch nominal in thickness and glazing molding to be 0.05-inch thick.
  - 3. Provide adjustable glass jacks to help center the glass in the door opening.
  - 4. Glazing Gaskets and Stops: Beveled, snap-on, extruded-aluminum stops and preformed extruded EDPM rubber.
- E. Materials:

1. Aluminum Extrusions: Alloy and temper recommended by aluminum-framed entrance door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090-inch wall thickness at any location for the main frame and door leaf members.
2. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum-framed entrance door members, trim hardware, anchors, and other components.
3. 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.
4. 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.
5. 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.

## 2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware".
- B. Coordinate door and frame preparation with Section 087100 "Door Hardware". Ensure proper size, thickness, hand function and finish of entrance door hardware.
- C. Weather Stripping: Manufacturer's standard replaceable components.
  1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
- D. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- E. Silencers: BHMA A156.16, Grade 1.

## 2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing".
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
- D. Sealants used inside the waterproofing system shall have a minimum VOC content of 250 g/L.

## 2.7 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1-inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

## 2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
  2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
  2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.9 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M10C21A44, Class I, 0.018 mm or thicker.
1. Color: Kawneer No. 18 Champagne.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

### 3.3 INSTALLATION

- A. General:
1. Comply with manufacturer's written instructions.
  2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 088000 "Glazing".

F. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

### 3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8-inch in 10 feet.
2. Level: 1/8-inch in 20 feet.
3. Alignment:
  - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2-inch wide, limit offset from true alignment to 1/16-inch.
  - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1-inch wide, limit offset from true alignment to 1/8-inch.
  - c. Where surfaces are separated by reveal or protruding element of 1-inch wide or more, limit offset from true alignment to 1/4-inch.



4. Location: Limit variation from plane to 1/8-inch in 12 feet; 1/2-inch over total length.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
  1. Water-Spray Test: Before installation of interior finishes has begun, an area shall be tested according to AAMA 501.2 and shall not evidence water penetration.
    - a. Perform a minimum of two tests in areas as directed by Architect.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.6 MAINTENANCE SERVICE

- A. Entrance Door Hardware:
  1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Government's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
  2. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

END OF SECTION 084113

## SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

## 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 glazed aluminum curtain walls.
- B. Related Requirements:
  - 1. Section 079200 - "Joint Sealants" at joints within or adjacent to the system.
  - 2. Section 084113 - "Aluminum-Framed Entrances and Storefronts" for less span glazing systems.
  - 3. Section 088000 - "Glazing" for glazing types within system.

## 1.3 PREINSTALLATION MEETINGS

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

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
  - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  - 2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.

- 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components.
- F. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and field-testing agency.
- B. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components from manufacturer.
  - 1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.
- C. Product Test Reports: For glazed aluminum curtain walls, for tests performed by a qualified testing agency.
- D. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- E. Source quality-control reports.
- F. Field quality-control reports.
- G. Sample Warranties: For special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.
- B. Maintenance Data for Structural Sealant: For structural-sealant-glazed curtain walls to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of curtain wall assemblies.

## 1.8 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall area.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.9 WARRANTY

- A. Special Assembly Warranty: Installer agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration created by wind and thermal and structural movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Failure of operating components.
  - 2. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color: Fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking: In excess of a No. 8 rating when tested according to ASTM D 4214.

- c. Other Issues: Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- 2. Warranty Period: Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, to design glazed aluminum curtain walls.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- C. Structural Loads:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Parallel to Glazing Plane: Limited to  $1/360$  of clear span or  $1/8$ -inch, whichever is smaller
  - 2. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
    - a. Perpendicular to Plane of Wall: No greater than  $1/240$  of clear span plus  $1/4$ -inch for spans greater than 11 feet 8-1/4-inches or  $1/175$  times span, for spans less than 11 feet 8-1/4-inches.
- E. Structural: Test according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas.
- I. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement of 0.010 times the story height and ultimate displacement of 1.5 times the design displacement.
- J. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.40 as determined according to NFRC 200.
  3. Condensation Resistance (CR): Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 25 as determined according to NFRC 500.
- K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
  2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
    - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.

- b. Low Exterior Ambient-Air Temperature: 0 deg F.
  - c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).
- L. Uniform Load: A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection more than L/175 of the span of any framing member at design load. At structural test load, equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members more than 0.02% of their clear spans shall occur.
- M. Structural-Sealant Joints:
  - 1. Designed to carry gravity loads of glazing.
  - 2. Designed to produce tensile or shear stress of less than 20 psi.

## 2.2 MANUFACTURERS

- A. Basis-of-Design Product: "1600 Wall System 1 Curtain Wall" manufactured by Kawneer North America; an Alcoa Company or a comparable product by one of the following:
  - 1. CMI Architectural.
  - 2. EFCO Corporation.
  - 3. Pittco Architectural Metals, Inc.
  - 4. TRACO.
  - 5. Tubelite, Inc.
  - 6. U.S. Aluminum; a brand of C.R. Laurence.
- B. Source Limitations: Obtain all components of curtain wall system and aluminum-framed entrance and storefront systems, including framing spandrel panels, entrances and accessories, from single manufacturer.

## 2.3 FRAMING

- A. Framing Members: Manufacturer's extruded or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken.
  - 2. Glazing System: 1-inch insulated glazing; retained mechanically with gaskets on four sides.
  - 3. Glazing Plane: Front.
  - 4. Finish: High-performance organic finish.
  - 5. Fabrication Method: Field-fabricated stick system.
  - 6. Profile Size: 2-1/2-inches by 7-1/2-inches.
  - 7. Door Jamb Profile Size: 3/4-inch by 4-1/2-inch door jamb.
  - 8. Trim: Outside and inside corner trim.
- B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.

1. Include snap-on aluminum trim that conceals fasteners.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
  1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209.
    - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
    - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    - d. Structural Profiles: ASTM B 308/B 308M.
  2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
    - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
    - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
    - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
  3. Fasteners: Aluminum, nonmagnetic stainless-steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components.
  4. 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.
  5. Pressure Plate: Pressure plate shall be aluminum and fastened to the mullion with stainless steel screws.
  6. 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 or SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
  7. Sealant: For sealants required within fabricated curtain wall system, provide permanently elastic, non-shrinking and non-migrating type recommended by sealant manufacturer for joint size and movement.

## 2.4 ENTRANCES

- A. Entrances: Comply with Section 084113 "Aluminum-Framed Entrances and Storefronts."

## 2.5 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing".



- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

## 2.6 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1-inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

## 2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
7. Components curved to indicated radii.

D. Fabricate components to resist water penetration as follows:

1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. Curtain-Wall Framing: Fabricate components for assembly using shear-block system.

F. Factory-Assembled Frame Units:

1. Rigidly secure nonmovement joints.
2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
3. Preparation includes, but is not limited to, cleaning and priming surfaces.
4. Seal joints watertight unless otherwise indicated.
5. Install glazing to comply with requirements in Section 088000 "Glazing".

G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.8 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M10C21A44, Class I, 0.018 mm or thicker.

1. Color: Kawneer No. 18 Champagne.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

### 3.3 INSTALLATION

#### A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

#### B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

- D. Install components plumb and true in alignment with established lines and grades.

- E. Install glazing as specified in Section 088000 "Glazing".

1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

- F. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

### 3.4 ERECTION TOLERANCES

- A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:

1. Plumb: 1/8-inch in 10 feet; 1/4- inch in 40 feet.
2. Level: 1/8-inch in 20 feet; 1/4-inch in 40 feet
3. Alignment:
  - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2-inch wide, limit offset from true alignment to 1/16-inch.
  - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1-inch wide, limit offset from true alignment to 1/8-inch.
  - c. Where surfaces are separated by reveal or protruding element of 1-inch wide or more, limit offset from true alignment to 1/4- inch.
4. Location: Limit variation from plane to 1/8-inch in 12 feet; 1/2-inch over total length.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner to engage a qualified testing agency to perform tests and inspections.
- B. Test Area: Perform tests on one bay at least 30 feet, by one story.
- C. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls
  1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
    - a. Perform a minimum of two tests in areas as directed by Architect.
  2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
    - a. Perform a minimum of two tests in areas as directed by Architect.
  3. Water Penetration: ASTM E 1105 at a minimum. No uncontrolled water leakages permitted when tested at a static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
- D. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 084413

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## SECTION 084523 - FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

## 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 aluminum-framed assemblies incorporating fiberglass-sandwich panels as follows:
  - 1. Prefabricated pyramid skylight assemblies.
  - 2. Prefabricated flat skylight assemblies.
- B. Related Requirements:
  - 1. Section 055963 "Detention Enclosures" for security screens at skylight assemblies.
  - 2. Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" for roofing at curbs for skylight assemblies.

## 1.3 PREINSTALLATION MEETINGS

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

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles and finishes for aluminum components of panel assemblies.
- B. Shop Drawings: For panel assemblies.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.
- C. Samples: In manufacturer's standard size.
  - 1. For each type of fiberglass-sandwich panel.
  - 2. For each type of exposed finish for framing members.

- D. Delegated-Design Submittal: For panel assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer, manufacturer and testing agency.
- B. Product Test Reports: For each fiberglass-sandwich-panel assembly, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For fiberglass-sandwich-panel assemblies from ICC-ES.
- D. Field quality-control reports.
- E. Sample Warranties: For special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For panel assemblies to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: For fiberglass-sandwich panels, a qualified manufacturer whose facilities, processes, and products are monitored by an independent, accredited quality-control agency for compliance with applicable requirements in ICC-ES AC04 or ICC-ES AC177.
- B. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.
- C. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.
- D. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES)

#### 1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of panel assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - c. Water leakage.

2. Warranty Period: One (1) year from date of Substantial Completion.
- B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace fiberglass-sandwich panels that exhibit defects in materials or workmanship within specified warranty period.
1. Defects include, but are not limited to, the following:
    - a. Fiberbloom.
    - b. Delamination of coating, if any, from exterior face sheet.
    - c. Color change exceeding requirements.
    - d. Delamination of panel face sheets from panel cores.
  2. Warranty Period: Ten (10) years from date of Substantial Completion.
- C. Special Aluminum-Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
1. Failures include, but are not limited to, checking, crazing, peeling, chalking, and fading of finishes.
  2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design fiberglass-sandwich-panel assemblies.
- B. Structural Loads: As indicated on Drawings.
- C. Deflection Limits:
1. Overhead Panel Assemblies: Standard panels shall deflect no more than 1.9-inches at 30 PSF in 10 ft. span without a supporting frame by ASTM E 72.
- D. Structural-Test Performance: Provide panel assemblies tested according to ASTM E 330, as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.



- E. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- F. Water Penetration under Dynamic Pressure: Provide panel assemblies that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
  - 1. Maximum Water Leakage: According to AAMA 501.1, no uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water that is controlled by flashing and gutters and drained to the exterior, or water that cannot damage adjacent materials or finishes.
- G. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.
- H. Energy Performance: Provide panel assemblies with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled according to NFRC:
  - 1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.23 Btu/hr/ft<sup>2</sup>/deg as determined according to NFRC 100.
  - 2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas shall have a SHGC of no greater than 0.28 as determined according to NFRC 200.
  - 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.
- I. Fall Through Resistance: Skylight system shall meet the fall through requirements of OSHA 1910.23 as demonstrated by testing in accordance with ASTM E 661, thereby not requiring supplemental screens or railings.
- J. Panel Strength:
  - 1. Maximum Panel Deflection: 3-1/2-inches when a 4-by-12-foot panel is tested according to ASTM E 72 at 34 lbf/sq. ft., with a maximum 0.090-inch set deflection after five minutes.
  - 2. Panel Support Strength: Capable of supporting, without failure, a 300-lbf concentrated load when applied to a 3-inch diameter disk according to ASTM E 661.
- K. Panel Performance:
  - 1. Self-Ignition Temperature: 650 deg F or more according to ASTM D 1929.

2. Smoke-Developed Index: 450 or less according to ASTM E 84, or 75 or less according to ASTM D 2843.
  3. Roof-Covering Classification: Class A according to ASTM E 108 or UL 790.
  4. Interior Face Sheets: Burn extent by ASTM D 635 shall be no greater than 1-inch.
  5. Color Change: Not more than 3.0 units Delta E, when measured according to ASTM D 2244, after outdoor weathering compliant with procedures in ASTM D 1435 and ASTM D 2244.
  6. Haze Factor: Greater than 90 percent when tested according to ASTM D 1003.
  7. Air Infiltration (ASTM E 283): Less than 0.01 cfm/Ft. squared at 6.24 PSF (50 mph).
  8. Burning Characteristics (ASTM E 84): Class CC@, burning rate of 2-1/2-inches per minute.
  9. Condensation Control: Integral internal gutters and non-clogging weeps to collect and drain condensation to the exterior.
- L. Sound Transmission Class (STC) Rating, provide materials and construction identical to those tested in assembly indicated according to ASTM E-90 and classified according to ASTM E 413 by an independent agency.
1. Sound Transmission Class (STC): Paired-panel assemblies shall have a minimum overall acoustic value of the following STC:
  2. Paired-Panel Assembly; 3-Inches Thick: STC [23]

## 2.2 FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

- A. Fiberglass-Sandwich-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with fiberglass-sandwich panels.
1. Basis-of-Design Product: Subject to compliance with requirements, provide "Pre-Engineered Pyramid Skylight" and "Ridge Span Skylight with Fixed HC Gable Ends System" as manufactured by Kalwall Corporation or comparable product by one of the following:
    - a. Major Industries, Inc.
    - b. CPI Daylighting.

## 2.3 FIBERGLASS-SANDWICH PANEL SKYLIGHT

- A. Prefabricated Roof Skylights:
1. Types: Pyramid and Flat S-Line types.
  2. Roof Panels.
    - a. 2-3/4-inch fiberglass sandwich panels.
    - b. High-impact FRP faces.
- B. Fiberglass-Sandwich Panels: Uniformly colored, translucent, thermoset, fiberglass-reinforced-polymer face sheets bonded to both sides of a grid core.

1. Core Insulation: Manufacturer's standard to meet energy performance requirements specified.
  2. Sizes: Refer to drawings.
- C. Panel Thickness: 2-3/4-inches.
- D. Panel Width: Not to exceed 2 ft.
- E. I-Beam Grid Core: Mechanically interlocked, extruded-aluminum I-beams, with a minimum flange width of 7/16-inch and 0.050-inch web thickness.
1. Extruded Aluminum: ASTM B 221, in alloy and temper recommended in writing by manufacturer.
  2. I-Beam Construction: Thermally-broken, extruded aluminum alloy 6061-T6.
  3. Grid Pattern: Inline rectangle, nominal 12 by 24-inches.
- F. Exterior Face Sheet:
1. Thickness: 0.070-inch.
  2. Color: Crystal.
  3. Protective Weathering Surface: Manufacturer's standard factory applied finish, which meets the performance requirements of AAMA 2604.
- G. Interior Face Sheet:
1. Thickness: 0.060-inch.
  2. Color: White.
- H. Fiberglass-Sandwich-Panel Adhesive: Manufacturer's standard for permanent adhesion of facings to cores.

## 2.4 ALUMINUM FRAMING SYSTEMS

- A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken, extruded aluminum members with internal guttering system.
- B. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
  2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  3. Extruded Structural Pipe and Tubes: ASTM B 429.
  4. Structural Profiles: ASTM B 308.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.

- D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.
  - 1. At closures, retaining caps, or battens, use ASTM A 193, 300 series stainless-steel screws.
  - 2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.
- E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- F. Anchor Bolts: ASTM A 307, Grade A, galvanized steel.
- G. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- H. Exposed Flashing and Closures: Aluminum sheet not less than 0.063-inch thick, finished to match framing.
- I. Framing Gaskets: Manufacturer's standard,
- J. Frame-System Sealants: As recommended in writing by manufacturer.
- K. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.5 FABRICATION

- A. Frame System Fabrication:
  - 1. Fabricate components that, when assembled, have the following characteristics:
    - a. Profiles that are sharp, straight, and free of defects or deformations.
    - b. Accurately fitted joints with ends coped or mitered.
    - c. Internal guttering systems or other means to drain water passing through joints, and moisture migrating within assembly to exterior.
  - 2. Fabricate sill closures with weep holes and for installation as continuous component.
  - 3. Reinforce components as required to receive fastener threads.
- B. Panel Fabrication: Factory assemble and seal panels.
  - 1. Laminate face sheets to grid core under a controlled process using heat and pressure to produce straight adhesive bonding lines that cover width of core members and that have sharp edges.

- a. White spots indicating lack of bond at intersections of grid-core members are limited in number to four for every 40-sq. ft. of panel and limited in diameter to 3/64-inch.
2. Fabricate with grid pattern that is symmetrical about centerlines of each panel.
3. Fabricate panel to allow condensation within panel to escape.
4. Reinforce panel corners.

## 2.6 METAL MATERIALS

- A. Extruded Aluminum shall be ANSI/ASTM B221; 6063-T6; 6063-T5 or 6005-T5.
- B. Flashing:
  1. 5005 H34 aluminum,
  2. Sheet metal flashings/closures/claddings are to be furnished shop formed to profile - when lengths exceed 10 ft. in nominal 10-ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6-in. to 8-in., set in a full bed of sealant and riveted if required.
- C. All Fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed aluminum finish shall be from manufacturer standard color range: Clear Anodize with five (5) year warranty

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
  1. Do not install damaged components.
  2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
  3. Rigidly secure nonmovement joints.
  4. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
  5. Seal joints watertight unless otherwise indicated.

- B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with corrosion-resistant coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install components plumb and true in alignment with established lines and elevations.
- D. Skylight Assemblies: Install continuous aluminum sill closures with weatherproof expansion joints and locked and sealed corners. Locate weep holes at rafters. Install components to drain water passing through joints and moisture migrating within assembly to exterior.
- E. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:
  - 1. Alignment: Limit offset from true alignment to 1/32-inch here surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3-inches; otherwise, limit offset to 1/8-inch.
  - 2. Location and Plane: Limit variation from true location and plane to 1/8-inch in 12 feet, but no greater than 1/2-inch over total length.

### 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
  - 1. Water-Spray Test: Before installation of interior finishes has begun, panel assemblies shall be tested per AAMA 501.2 and shall not show evidence of water penetration.
  - 2. Water Penetration under Static Pressure: Before installation of interior finishes has begun, areas shall be tested according to ASTM E 1105 and ASTM E 331.
    - a. Water Penetration: None at 15 PSF.
- B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

END OF SECTION 084523

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## SECTION 085663 - DETENTION WINDOWS

## 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. Fixed detention windows.

- B. Related Requirements:

- 1. Section 072119 – "Foamed-in-Place Insulation" for filling frame cavity of detention windows.
  - 2. Section 083463 - "Detention Doors and Frames" for detention-grade hollow-metal sidelights and borrowed lights.
  - 3. Section 088853 - "Security Glazing" for glazing type incorporated into detention windows.
  - 4. Section 099113 - "Exterior Painting" for field painting exterior detention windows.
  - 5. Section 099123 - "Interior Painting" for field painting interior detention windows.

## 1.3 COORDINATION

- A. Coordinate installation of anchorages for detention windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

## 1.4 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention windows.

- B. Shop Drawings: For detention windows.

- 1. Include plans, elevations, sections, and attachment details.
  - 2. Full-size section details of framing members, including detention bars, reinforcement and stiffeners.
  - 3. Location of weep holes.



4. Hardware, including operators.
5. Glazing details.

C. Samples for Verification: For each type of exposed finish required.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and testing agency.
- B. Welding certificates.
- C. Material Certificates: For homogeneous tool-resisting steel indicating compliance with performance requirements for complete test sequence according to applicable ASTM standard.
- D. Material Test Reports: For homogeneous tool-resisting steel.
- E. Product Test Reports: For each type of detention window, for tests performed by a qualified testing agency.
- F. Sample Warranties: For manufacturer's special warranties.
- G. Examination reports documenting inspections of substrates, areas, and conditions.
- H. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
- I. Field quality-control reports.
  1. Field quality-control certification signed by Detention Equipment Contractor.

#### 1.6 FIELD CONDITIONS

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

#### 1.7 MAINTENANCE MATERIAL

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
  2. Tools: Provide two sets of tools for installing and removing security fasteners.

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
2. AWS D1.3, "Structural Welding Code - Sheet Steel".
3. AWS D1.6, "Structural Welding Code - Stainless Steel".

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace detention windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Structural failures including deflections exceeding 1/4-inch.
  - b. Failure of welds.
  - c. Lateral deflection of glass lite edges in excess of 1/175.
  - d. Excessive air leakage.
  - e. Excessive water penetration.

B. Warranty:

1. Repair or replace, at manufacturer's option and expense, any materials or workmanship found to be defective under conditions of normal use during this period.
  - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering and detention use.
2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENT

- A. Attack Resistance: Grade 1 when tested according to ASTM F 1592.
- B. Impact Test meets or exceeds ASTM F 1592-01 "Standard Test methods for Detention Hollow Metal Vision Systems".
  1. Impact Blows: Must withstand a minimum of 600 blows at each impact location (1200 total blows per frame without rail bar, 1800 total blows per frame with rail bar).
  2. Glazing Test: The glazing and panels shall remain in place. No damage to the extent that forcible entry can be achieved.
  3. Frame Test: Welded joints or the entire frame joint shall not separate.
  4. The wall anchoring shall retain the frame in place throughout the test procedure to the extent that forcible entry cannot be achieved.

5. Along with submittals, the window manufacturer shall provide the applicable test report from a qualified independent testing laboratory regularly engage in testing windows to verify that their products conform to these test requirements. All testing must be current and meet minimum requirements in conformance with specifications.
- C. Structural Loads: Detention windows shall withstand the effects of wind loads, with no permanent deformation or breakage of components within window assembly when tested according to ASTM E 330.
  1. Wind Loads: As indicated on Drawings.
- D. Air Infiltration: Provide windows with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283, maximum air infiltration .06 CFM/Sq. Ft.
- E. Water Penetration under Static Pressure: Provide windows that meet or exceeds ASTM E 331, no water penetration for 15 minutes when the window is subjected to a rate of flow of 5 gal./hr/sq. ft. with differential pressure across the window unit of 2.86 PSF.
- F. Tool-resisting steel, meets or exceeds ASTM A627-03 Grade 4, submit test reports from a qualified independent testing laboratory verifying that the window manufacturer's tool-resisting steel is in conformance with ASTM A627-03.
- G. Energy Performance: Provide windows with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled in accordance with NFRC:
  1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
    - a. U-Factor: U-0.70.
  2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.6 as determined according to NFRC 200.
- H. Condensation Resistance: CFR-49.

## 2.2 FIXED DETENTION WINDOWS

- A. Steel Framing: Fabricate perimeter framing, removable covers, muntins and mullions from 12 gage nominal-thickness, cold-rolled steel sheet. Provide thermally improved construction.
  1. Basis-of-Design Product: Provide "Model STB30" Steel Fixed Thermal Break Detention Window manufactured by Hope's Windows, Inc. or a comparable product by one of the following:
    - a. Torrance Steel Window Company, Inc.; Torrance, CA.

- B. Thermal Break: 1/4-inch by 3/4-inch rigid vinyl plastic.
- C. Detention Bars:
  - 1. Tool-Resisting-Steel Bar Grid: 1-inch diameter, tool-resisting-steel, round bars concealed within mutins at 6-inches o.c., oriented along length of window unless otherwise indicated, with 1/4-inch by 2-inch tool resisting-steel, flat bars concealed within perimeter frame.
    - a. Steel: Homogeneous, tool-resisting steel Grade 3 according to ASTM A 627.
- D. Glazing and Glazing Materials: Comply with requirements in Section 088853 "Security Glazing".
- E. Materials:
  - 1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
  - 2. Tool-Resisting-Steel Bars: ASTM A 627.

## 2.3 FABRICATION

- A. General: Fabricate detention windows to provide a complete system for assembly of components and anchorage of window units.
  - 1. Provide units that are reglazable from the exterior.
  - 2. Fabricate detention window frames of one-piece construction, except where removable covers are indicated.
  - 3. Form removable covers to profiles indicated on Drawings.
- B. Anchors for In-Place Construction Installation: 3/16-inch thick steel angles or formed-steel plates 3-inches long, welded to back of detention window frames as required to secure detention windows to adjacent construction.
  - 1. Provide two anchors per side of window plus one additional anchor for every 18-inches or fraction thereof more than 36-inches in height or width.
  - 2. Provide 3/16-inch thick loose steel angle clips, 2-inches long for field welding to frame anchor.
- C. Glazing Stop Heights: Minimum 1.25 inches to provide minimum 1-inch glass engagement.
- D. Provide weep holes and internal water passages to conduct infiltrating water to the exterior.
- E. Thermally Broken Construction: Fabricate framing with an integral, concealed, low-conductance thermal barrier, located between steel sub-frames and underneath glazing in a manner that eliminates direct metal-to-metal contact. Attach with security fasteners.

- F. Detention Bars: Fabricate flat bar perimeter frame to allow round bars to penetrate and create a secure grid. Weld round bars to back side of flat bars. Conceal detention bars within window framing.
- G. Muntins: Attach muntins to perimeter framing with concealed welds.
- H. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- I. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- J. Glazing Stops: Provide glazing stops applied with security fasteners or rivets and coordinated with glazing indicated. Finish glazing stops to match window units.
- K. Security Fasteners: Fabricate detention windows using security fasteners with head style appropriate for fabrication requirements, strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project.
  - 1. Provide stainless-steel security fasteners in stainless-steel materials

#### 2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

#### 2.5 STEEL FINISHES

- A. Galvanizing: After fabrication, galvanize window components by chemical cleaning complying with SSPC-SP 1, "Solvent Cleaning," and pickling treatment complying with SSPC-SP 8, "Pickling", followed by hot-dip galvanizing complying with ASTM A 123/A 123M.
- B. Factory Prime Finish: After surface preparation and pretreatment, apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer.
- C. E-Coat Prime Painting:

1. Following the pretreatment windows and accessories are e-coated with a cathodic epoxy primer of PPGH "Powercron 800" or equivalent to insure all surfaces are evenly covered. Spray or dip primers shall not be acceptable.
2. Immersed in a rinse of ultra-filtered RO water for 3 minutes to remove all the excess paint and removing any runs.
3. A spray of ultra-filtered RO water repeats the above process to further improve surface conditions.
4. The primer is oven baked to 335 degrees F for 15 minutes to a dry film thickness of 0.7 - 1.0 mil.
5. The material is then cooled in preparation for the finish coat.

D. Ultrathane Finish Painting:

1. Following the prime coat, all windows and accessories are given a spray coat of acrylic polyurethane and oven baked at 225 degrees F for 15 minutes to dry film thickness of 1.5 to 2.0 mils.
2. The combined overall dry film thickness of the prime coat and finish coat shall be 2.2 - 3.0 mils.
3. The architect shall choose from an unlimited color selection. Color matching is available upon request, along with clear coats. Some colors may require clear coats for added protection. Consult your Hope's Representative for selection assistance

E. E-Coat/top coat combination shall provide full documented compliance with all ASTM designations as outlined in Quality Assurance portion of the specification.

1. Color and Gloss: Match color of aluminum storefront system.

## 2.6 SECURITY FASTENERS

A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific type of fastener. Drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:

1. Drive-System Type: Torx.
2. Fastener Strength: 120,000 psi.
3. Socket Button Head Fasteners:
  - a. Stainless steel, ASTM F 879, Group 1 CW.
4. Socket Flat Countersunk Head Fasteners:
  - a. Stainless steel, ASTM F 879, Group 1 CW.
5. Socket Head Cap Fasteners:
  - a. Stainless steel, ASTM F 837, Group 1 CW.

## 2.7 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
  - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed; hot-dip galvanized according to ASTM A 153/A 153M or ASTM F 2329.
- B. Embedded Plate Anchors: Fabricated from mild-steel shapes and plates, minimum 3/16-inch thick; with minimum 1/2-inch diameter, headed studs welded to back of plate.
  - 1. Provide embed anchors to precast fabricator.
- C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welding.
- D. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633; provide sufficient strength to withstand design pressures indicated.
- E. Grout: ASTM C 476, slump not more than 4 inches as measured according to ASTM C 143/C 143M.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. Exterior Sealants: Comply with Section 079200 "Joint Sealants".
- H. Weather Stripping: Unless otherwise indicated, at venting units provide weather stripping such as molded EPDM or neoprene gaskets complying with ASTM D 2000, Designations 2BC415 to 3BC620, or molded PVC gaskets complying with ASTM D 2287; or molded, expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention windows.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention window connections before detention window installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention windows.
- D. Inspect built-in and cast-in anchor installations, before installing detention windows, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Re-inspect after repairs or replacements are made.
  2. Perform additional inspections to determine compliance of replaced or additional work. Prepare anchor inspection reports.
- E. For glazing materials, whose orientation is critical for performance, verify installation orientation.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other detention window anchors whose installation is specified in other Sections.
1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.
- B. In-Place-Construction Anchors: Install embedded plate anchors 3/16-inch- (4.8-mm-) thick steel angle or formed-steel plate anchors with attached 1/2-inch- (13-mm-) diameter anchor studs in window openings at locations corresponding to detention window-frame anchors

### 3.3 INSTALLATION

- A. General: Install detention windows level, plumb, rigid, properly aligned, and securely fastened in place, complying with Drawings, Coordination Drawings, and manufacturer's written instructions.
1. Provide anchorage devices and fasteners as required to secure detention windows to wall construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
- B. In-Place-Construction Anchor Installation: Weld angle anchors to embedded anchors to match locations of detention window-frame anchors. Detach removable covers from detention window frames and set frames into opening until detention window-frame anchors contact and match embedded anchors. Weld detention window-frame anchors to embedded anchors with a minimum 1-inchlong welds with spacing not to exceed 18-inches. Reinstall removable covers.
1. Fill cavity of detention window frames with foamed-in-place insulation before reinstalling removable covers.
- C. Removable Covers, Glazing Stops, and Trim: Fasten components with security fasteners.
- D. Security Fasteners: Install detention windows using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project. Provide stainless-steel security fasteners in stainless-steel materials.



- E. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
  - 1. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.
  - 2. Security Sealant: At inmate side, apply polyurethane security sealant between detention window frame and adjacent construction.
- F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- G. Glazing: Comply with installation requirements in Section 088853 "Security Glazing" unless otherwise indicated.

#### 3.4 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Remove and replace detention work where inspections indicate that work does not comply with specified requirements.
- C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- D. Prepare field quality-control certification that states installed products and their installation comply with requirements in the Contract Documents.

#### 3.5 ADJUSTING

- A. Remove and replace defective work, including detention windows that are warped, bowed, or otherwise unacceptable.

#### 3.6 CLEANING AND PROTECTION

- A. Clean surfaces promptly after installation of detention windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
- B. Clean glass of preglazed detention windows promptly after installation. Comply with requirements in Section 088853 "Security Glazing" for cleaning and maintenance.
- C. Provide temporary protection to ensure that detention windows are without damage at time of Substantial Completion.

END OF SECTION 085663

## SECTION 087100 – DOOR HARDWARE

## 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. Mechanical and electrified door hardware for:
  - a. Swinging doors.
  - b. Sliding doors.
  - c. Gates.
- 2. Electronic access control system components.

## B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

- 1. Windows
- 2. Cabinets (casework), including locks in cabinets
- 3. Signage
- 4. Toilet accessories
- 5. Overhead and coiling doors
- 6. Sliding aluminum doors
- 7. Folding Partitions
- 8. Chain link and wire mesh doors and gates

## C. Related Sections:

- 1. Division 01 Section "Alternates" for alternates affecting this section.
- 2. Division 06 Section "Rough Carpentry"
- 3. Division 06 Section "Finish Carpentry: Installation of Finish Hardware"
- 4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
- 5. Division 08 Section "Hollow Metal Doors and Frames"
- 6. Division 08 Section "Access Doors and Frames"
- 7. Division 08 Section "Detention Door Hardware"
- 8. Division 08 Section "Aluminum Framed Entrances and Storefronts"
- 9. Division 11 Section "Detention Doors and Frames"
- 10. Division 26 sections for connections to electrical power system and for low-voltage wiring.

11. Division 28 sections for coordination with other components of electronic access control system.

### 1.3 REFERENCES

#### A. UL - Underwriters Laboratories

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

#### B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

#### C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

### 1.4 SUBMITTALS

#### A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

#### B. Action Submittals:

1. Product Data: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
  - a. Wiring Diagrams: For power, signal, and control wiring and including:
    - 1) Details of interface of electrified door hardware and building safety and security systems.
    - 2) Schematic diagram of systems that interface with electrified door hardware.
    - 3) Point-to-point wiring.

- 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
  - a. Samples will be returned to supplier in like-new condition. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
  - a. Door Index; include door number, heading number, and Architects hardware set number.
  - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
  - c. Type, style, function, size, and finish of each hardware item.
  - d. Name and manufacturer of each item.
  - e. Fastenings and other pertinent information.
  - f. Location of each hardware set cross-referenced to indications on Drawings.
  - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
  - h. Mounting locations for hardware.
  - i. Door and frame sizes and materials.
  - j. Name and phone number for local manufacturer's representative for each product.
  - k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include how door will operate on egress, ingress, and fire and smoke alarm connection.
  - l. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
5. Key Schedule:
  - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
  - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
  - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
  - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.

- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
    - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
  - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.
- C. Informational Submittals:
- 1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
  - 2. Product Certificates, signed by manufacturer:
    - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
  - 3. Certificates of Compliance:
    - a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
    - b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
    - c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.
  - 4. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.
  - 5. Warranty: Special warranty specified in this Section.
- D. Closeout Submittals:
- 1. Operations and Maintenance Data : Provide in accordance with Division 01 and include:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Name, address, and phone number of local representative for each manufacturer.
    - d. Parts list for each product.
    - e. Final approved hardware schedule, edited to reflect conditions as-installed.
    - f. Final keying schedule
    - g. Copies of floor plans with keying nomenclature
    - h. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

- i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

## 1.5 QUALITY ASSURANCE

- A. Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.
  1. Where specific manufacturer's product is named and accompanied by "No Substitute," including make or model number or other designation, provide product specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
    - a. Where no additional products or manufacturers are listed in product category, requirements for "No Substitute" govern product selection.
  2. Where products indicate "acceptable manufacturers" or "acceptable manufacturers and products", provide product from specified manufacturers, subject to compliance with specified requirements and "Single Source Responsibility" requirements stated herein.
- B. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
  1. Distributor must be a factory authorized dealer for all materials required.
  2. Facility with warehouse, inventory, and qualified personnel on staff within 100 miles of project.
  3. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  4. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
  5. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
    - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- C. Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.
- D. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
  1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).

2. Can provide installation and technical data to Architect and other related subcontractors.
  3. Can inspect and verify components are in working order upon completion of installation.
  4. Capable of producing wiring diagrams.
  5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.
- E. Single Source Responsibility: Obtain each type of door hardware (locksets, exit devices, closers, etc) from single manufacturer.
1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
  2. Manufacturers that perform electrical modifications and that are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- F. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- G. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
- H. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- I. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.
- J. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist.
  2. Maximum opening-force requirements:
    - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
    - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
    - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
  3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2- inch (13 mm) high.

4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.
- K. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01.
1. Attendees: Owner or Owner Representative, Contractor, Architect, Installer, and Supplier's Architectural Hardware Consultant.
  2. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
    - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
    - b. Door locking function.
    - c. Preliminary key system schematic diagram.
    - d. Requirements for key control system.
    - e. Requirements for access control.
    - f. Address for delivery of keys and permanent cores.
- L. Pre-installation 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. Inspect and discuss preparatory work performed by other trades.
  3. Inspect and discuss electrical roughing-in for electrified door hardware.
  4. Review sequence of operation for each type of electrified door hardware.
  5. Review required testing, inspecting, and certifying procedures.
- M. Coordination Conferences:
1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
    - a. Attendees: Door hardware supplier, door hardware installer, Contractor.
    - b. After meeting, provide letter of compliance to Architect, indicating when meeting was held and who was in attendance.
  2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.
    - a. Attendees: electrified door hardware supplier, doors and frames supplier, electrified door hardware installer, electrical subcontractor, Owner or Owner representative, Architect and Contractor.
    - b. After meeting, provide letter of compliance to Architect, indicating when coordination conference was held and who was in attendance.



## 1.6 DELIVERY, STORAGE, AND HANDLING

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

## 1.7 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, including access control and keying, with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Direct shipments not permitted, unless approved by Contractor.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
    - a. Closers:
      - 1) Mechanical: 30 years.
    - b. Automatic Operators: 2 years.
    - c. Exit Devices:
      - 1) Mechanical: 3 years.
      - 2) Electrified: 1 year.
    - d. Locksets:
      - 1) Mechanical: 3 years.
      - 2) Electrified: 1 year.
    - e. Continuous Hinges: Lifetime warranty
    - f. Key Blanks: Lifetime
  - 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

## 1.9 MAINTENANCE

- A. Maintenance Tools:
  - 1. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

## 2.2 MATERIALS

### A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

### B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

### C. Security Fasteners:

1. All hardware products shall have security fasteners with TORX heads.

## 2.3 HINGES

### A. Provide five-knuckle, ball bearing hinges.

#### 1. Manufacturers and Products:

- a. Scheduled Manufacturer and Product: Ives 5BB series
- b. Acceptable Manufacturers and Products: Hager BB series, Bommer BB5000

### B. Requirements:

1. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
2. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Steel Hinges: Steel pins
  - b. Non-Ferrous Hinges: Stainless steel pins
  - c. Out-Swinging Exterior Doors: Non-removable pins
  - d. Out-Swinging Interior Lockable Doors: Non-removable pins
  - e. Interior Non-lockable Doors: Non-rising pins
3. Width of hinges: 4-1/2 inches at 1-3/4 inch thick doors, and 5 inches at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

4. Doors 36 inches wide or less furnish hinges 4-1/2 inches high; doors greater than 36 inches wide furnish hinges 5 inches high, heavy weight or standard weight as specified.

## 2.4 CONTINUOUS HINGES

### A. Aluminum Geared

#### 1. Manufacturers:

- a. Scheduled Manufacturer: Ives.
- b. Acceptable Manufacturers: Pemko, Select.

#### 2. Requirements:

- a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.25, Grade 2.
- b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum, with 0.25-inch diameter Teflon coated stainless steel hinge pin.
- c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
- d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
- e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
- f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
- g. Install hinges with fasteners supplied by manufacturer.
- h. Provide hinges with symmetrical hole pattern.

## 2.5 ELECTRIC POWER TRANSFER

### A. Manufacturers:

- a. Scheduled Manufacturer: Von Duprin
- b. Acceptable Manufacturers: No Substitute

### B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

### C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

## 2.6 FLUSH BOLTS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

### B. Requirements:

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

## 2.7 COORDINATORS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

### B. Requirements:

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

## 2.8 MORTISE LOCKS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage L9000 series
2. Acceptable Manufacturers and Products: No Substitute

### B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.

2. Provide locks with standard 2-3/4-inches (70 mm) backset with full 3/4- inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
4. Verify lock functions with owner prior to ordering.
5. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide a request to exit (RX) switch that is actuated with rotation of inside lever.
6. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
  - a. Lever Design: Schlage 06A.
  - b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

## 2.9 AUXILIARY LOCKS

### A. Deadlocks:

1. Manufacturers and Products:
  - a. Scheduled Manufacturer and Product: Schlage L400 series
  - b. Acceptable Manufacturers and Products: No Substitute
2. Requirements:
  - a. Provide mortise deadlock series conforming to ANSI/BHMA A156 and function as specified. Cylinders: Refer to "KEYING" article, herein.
  - b. Provide deadlocks with standard 2-3/4 inches (70 mm) backset. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
  - c. Provide manufacturer's standard strike.
  - d. Verify deadbolt functions with owner prior to ordering.

## 2.10 EXIT DEVICES

### A. Manufacturer and Product:

1. Scheduled Manufacturer: Von Duprin 99/33 series
2. Acceptable Manufacturers and Products: No Substitute.

### B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3-2014 Grade 1, and UL listed for Panic Exit or Fire Exit Hardware. Cylinders: Refer to "KEYING" article, herein.
2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.

3. Quiet Operation: Incorporate fluid damper or other device that eliminates noise of exit device operation.
4. Touchpad: Extend minimum of one half of door width, but not the full length of exit device rail. Provide end-cap with two-point attachment to door. Match exit device finish, stainless steel for US26, US26D, US28, US32, and US32D finishes; and for all other finishes, provide compatible finish to exit device. Provide compression springs in devices, latches, and outside trims or controls; tension springs prohibited.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrical requirements.
6. Provide exit devices with manufacturer's approved strikes.
7. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
8. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
9. Provide cylinder dogging at non-fire-rated exit devices, unless specified less dogging.
10. Removable Mullions: 2-inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion that is removed by use of a keyed cylinder, which is self-locking when re-installed.
11. Verify exit device functions with owner prior to ordering.
12. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
  - a. Lever Style: Match lever style of locksets.
  - b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.
13. Provide UL labeled fire exit hardware for fire rated openings.
14. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
15. Provide electrified options as scheduled in the hardware sets.

## 2.11 CYLINDERS

### A. Manufacturers:

1. Scheduled Manufacturer: Schlage
2. Acceptable Manufacturers: No Substitute

### B. Requirements:

1. Provide cylinders/cores, from the same manufacturer of locksets, compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
  - a. Cylinder/Core Type: Large Format or Full Size Interchangeable Core (LFIC/FSIC).
  - b. Keyway/Security Type: Restricted/Patented.
3. Nickel silver bottom pins.
4. Replaceable Construction Cores.
  - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
    - 1) 2 construction control keys.
    - 2) 12 construction change (day) keys.
5. Verify with owner where permanent cores are to be shipped to.

## 2.12 KEYING

- A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
  1. Provide keying system capable of multiplex master keying.
  2. Permanent cylinders/cores keyed by the manufacturer according to the following key system.
    - a. Keying system as directed by the Owner.
    - b. (Great)Grand Master Key System: Cylinders/cores operated by change (day) keys and subsequent masters (including grand/great grand) keys.
  3. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.
  4. Provide keys with the following features:
    - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm).
    - b. Restricted/Patented.
  5. Identification:
    - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
    - b. Identification stamping provisions must be approved by the Architect and Owner.
    - c. Stamp keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
    - d. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to Owner.



6. Quantity: Furnish in the following quantities.
  - a. Change (Day) Keys: 3 per cylinder/core.
  - b. Permanent Control Keys: 3 (if required).
  - c. Master Keys: 6 per master.
  - d. Unused balance of key blanks shall be furnished to Owner with the cut keys.
  - e. Blanks: 2 Boxes Of Key Blanks (100 total).
7. Verify with owner where permanent keys are to be shipped to.

## 2.13 KEY CONTROL SYSTEM

### A. Manufacturers:

1. Scheduled Manufacturer: Telkee
2. Acceptable Manufacturers: HPC, Lund

### B. Requirements:

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

## 2.14 DOOR CLOSERS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4040XP series.
2. Acceptable Manufacturers and Products: No Substitute.

### B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 3/4-inch (19 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.

6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

## 2.15 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4600 series
2. Acceptable Manufacturers and Products: No Substitute

### B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check valve, sweep valve, latch valve to control door.
6. Provide drop plates, brackets, or adapters for arms as required for details.
7. Provide hard-wired actuator switches for operation as specified.
8. Provide weather-resistant actuators at exterior applications.
9. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
10. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
11. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

## 2.16 DOOR TRIM

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

### B. Requirements:

1. Provide push plates 4-inches (102 mm) wide by 16-inches (406 mm) high by 0.050-inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4-inches (102 mm) wide plate, adjust width to fit.
2. Provide pull plates 4-inches (102 mm) wide by 16-inches (406 mm) high by 0.050-inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4-inches (102 mm) wide plate, adjust width to fit.

## 2.17 PROTECTION PLATES

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

### B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050-inch thick, beveled four edges as scheduled. Furnish with countersunk sheet metal screws, finished to match plates.
2. Adjust width accordingly for other conflicting hardware (astragals, mullions, etc).
3. Sizes of plates:
  - a. Kick Plates: 10 inches high by 1-1/2-inches less width of door on push side of single doors, 1-inch less width of door on push side of pairs
  - b. Mop Plates: 4-inches high by 1-inches less width of door on pull side of single and paired doors
  - c. Armor Plates: 35 inches high by 1 -1/2-inches less width of door on push side of single doors, 1-inch less width of door on push side of pairs

## 2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

### A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson
2. Acceptable Manufacturers: No Substitute

### B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.

2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

## 2.19 DOOR STOPS AND HOLDERS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

### B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

## 2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

### A. Manufacturers:

1. Scheduled Manufacturer: Zero
2. Acceptable Manufacturers: National Guard, Reese, Pemko

### B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size threshold width for full wall width when frames are recessed.
3. Cope thresholds at jambs and in front of mullions if thresholds project beyond door faces.
4. Furnish thresholds with non-ferrous stainless steel screws and lead anchors.
5. Furnish thresholds with slip resistant coating at exterior openings and where moisture is present.
6. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

## 2.21 SILENCERS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

### B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

## 2.22 DOOR POSITION SWITCHES

### A. Manufacturers:

1. Scheduled Manufacturer: Detex
2. Acceptable Manufacturers: No Substitute

### B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches between switch and magnetic locking device.

## 2.23 FINISHES

- A. Provide finish for each item as indicated in the sets.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Custom Steel Doors and Frames: HMMA 831.
  - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
  - 1. Replace construction cores with permanent cores as indicated in keying section.
- I. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
  - 1. Conduit, junction boxes and wire pulls.
  - 2. Connections to and from power supplies to electrified hardware.
  - 3. Connections to fire/smoke alarm system and smoke evacuation system.
  - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
  - 5. Testing and labeling wires with Architect's opening number.
- J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless noted otherwise or approved by Architect.

- L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- Q. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

### 3.3 FIELD QUALITY CONTROL

- A. Architectural Hardware Consultant: Engage qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
  - 1. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

### 3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

### 3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.

- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### 3.6 DEMONSTRATION

- A. Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

### 3.7 DOOR HARDWARE SCHEDULE

- A. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.
- B. Hardware Sets:

#### **HARDWARE GROUP NO. 01**

*FOR USE ON DOOR #(S):*

B1130              B1132              C1074              C1075

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	OH STOP	450S	652	GLY
3	EA	SILENCER	SR64	GRY	IVE



**HARDWARE GROUP NO. 02***FOR USE ON DOOR #(S):*

B1004                B1011                B1012                B1013

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 02A***FOR USE ON DOOR #(S):*

B1005                B1006                B1010

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 03***FOR USE ON DOOR #(S):*

C1066

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PASSAGE SET	L9010 06A	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 04***FOR USE ON DOOR #(S):*

C1030A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 05***FOR USE ON DOOR #(S):*

B1008                  B1009                  C1032                  C1033                  C1036A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 06***FOR USE ON DOOR #(S):*

B1000B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR X PULL TRIM	330 X 990DT	626	VON
1	EA	OH STOP	90S -> @ AUTO OP LEAF	630	GLY
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC -> FLUSH CEILING MOUNT	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853T	630	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	FLUSH MOUNT BOX	8310-867F	689	LCN
1	EA	WEATHER RING	8310-801 -> @ EXTERIOR	PLA	LCN
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

*BOTH AUTO OPERATOR ACTUATORS ENABLED AT ALL TIMES. PUSHING EITHER ACTUATOR SIGNALS  
AUTO OPERATOR TO MOMENTARILY OPEN DOOR. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 07***FOR USE ON DOOR #(S):*

B1000A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR X PULL TRIM	330 X 990DT	626	VON
2	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

**HARDWARE GROUP NO. 08***FOR USE ON DOOR #(S):*

C1034A          C1034B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CYL X TURN DEAD LOCK	L460T L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 09***FOR USE ON DOOR #(S):*

C1017

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 10***FOR USE ON DOOR #(S):*

B1065              B1075              B1131              C1060

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 10A***FOR USE ON DOOR #(S):*

B1026              B1027

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 11***FOR USE ON DOOR #(S):*

B1017            C1008A            C1024            C1025            C1026

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 12***FOR USE ON DOOR #(S):*

B1066            B1076            D0001            E0001

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L583-363 L283-722	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 13***FOR USE ON DOOR #(S):*

B1070	B1071	B1072	B1073	B1128	C1016
C1018	C1019	C1020	C1021	C1022	C1029
C1043	C1068	C1069			

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 13A***FOR USE ON DOOR #(S):*

B1064

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	FLOOR STOP	FS436/FS438	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 13B***FOR USE ON DOOR #(S):*

C1047C

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	SOUND SEAL	870AA-S	AA	ZER
1	EA	AUTO DR BTM, MORTISE (SOUND)	360AA-LS	AA	ZER

**HARDWARE GROUP NO. 14***FOR USE ON DOOR #(S):*

C1062

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS33/WS33X (MOUNT ON SIDELITE MULLION OR BACK OF DOOR TO AVOID GLASS)	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 15 - NOT USED**



**HARDWARE GROUP NO. 16***FOR USE ON DOOR #(S):*

C1015            C1070A            C1071A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 17***FOR USE ON DOOR #(S):*

B1124            C1046            C1070B            C1071B            C1072

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 18***FOR USE ON DOOR #(S):*

C1077                C1078

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 19***FOR USE ON DOOR #(S):*

B1069

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 20***FOR USE ON DOOR #(S):*

B1035

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 21***FOR USE ON DOOR #(S):*

B1074

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 21A***FOR USE ON DOOR #(S):*

C1027

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 22***FOR USE ON DOOR #(S):*

C1028

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	L9070T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	SOUND SEAL	870AA-S	AA	ZER
1	EA	AUTO DR BTM, MORTISE (SOUND)	360AA-LS	AA	ZER

**HARDWARE GROUP NO. 23***FOR USE ON DOOR #(S):*

C1035

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CONST LATCHING BOLT (HM)	FB51T	630	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	OH STOP	450S	652	GLY
1	EA	WALL STOP	WS401/402CVX	626	IVE
2	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 24***FOR USE ON DOOR #(S):*

C1008

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	OH STOP	450S	652	GLY
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 25***FOR USE ON DOOR #(S):*

C1002B          C1004          C1005          C1012          C1041          D0002  
E0002

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 26***FOR USE ON DOOR #(S):*

C1000A          C1006B          C1007B          C1031B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 27***FOR USE ON DOOR #(S):*

A2001

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 28***FOR USE ON DOOR #(S):*

C1038

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE TRACK CLOSER (W/ STOP)	4040XPT BUMP MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*



**HARDWARE GROUP NO. 29***FOR USE ON DOOR #(S):*

B1126	C1001	C1002A	C1006A	C1007A	C1039
C1040	C1045	C1048	C1050	C1055	

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 30***FOR USE ON DOOR #(S):*

C1047A            C1052C            C1056

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 31***FOR USE ON DOOR #(S):*

B1127              B1129              C1031A              C1037              C1051

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 32***FOR USE ON DOOR #(S):*

C1000B            C1000C

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET
1	EA	DESK MOUNT BUTTON	660-PB	628	SCE

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER, OR PUSH BUTTON AT DESK, WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 33***FOR USE ON DOOR #(S):*

A1002            A1003A            C1047B            C1085

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 34***FOR USE ON DOOR #(S):*

C1030B            C1052A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 34A***FOR USE ON DOOR #(S):*

B2000B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
1	EA	DOOR POSITION SWITCH	MS2049F		DET

**HARDWARE GROUP NO. 35***FOR USE ON DOOR #(S):*

C1036B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 36 - NOT USED**



**HARDWARE GROUP NO. 37***FOR USE ON DOOR #(S):*

B1085                B1108                C1064                C1083

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 38 - NOT USED****HARDWARE GROUP NO. 39***FOR USE ON DOOR #(S):*

B1007                B1084                B1094

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 40***FOR USE ON DOOR #(S):*

C1054B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	FIRE EXIT HARDWARE	99-NL-F	626	VON
1	EA	RIM CYL HOUSING (FSIC)	20-079 ICX	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ DEAD STOP)	4040XP CUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 41***FOR USE ON DOOR #(S):*

B1028                  B2002

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 42***FOR USE ON DOOR #(S):*

B2001

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER
1	EA	DOOR POSITION SWITCH	MS2049F		DET

**HARDWARE GROUP NO. 43***FOR USE ON DOOR #(S):*

C1076                  C1080                  D1004                  E1011

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 43A***FOR USE ON DOOR #(S):*

B1030

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 44***FOR USE ON DOOR #(S):*

C1079

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER
1	EA	DOOR POSITION SWITCH	MS2049F		DET

**HARDWARE GROUP NO. 45***FOR USE ON DOOR #(S):*

B1024                C1065B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 46***FOR USE ON DOOR #(S):*

C1054A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	FIRE EXIT HARDWARE	99-NL-F	626	VON
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	RIM CYL HOUSING (FSIC)	20-079 ICX	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER

**HARDWARE GROUP NO. 47***FOR USE ON DOOR #(S):*

A1001

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 48***FOR USE ON DOOR #(S):*

C1011

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CONST LATCHING BOLT (HM)	FB51T	630	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
2	EA	WALL STOP	WS401/402CVX	626	IVE
2	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 49***FOR USE ON DOOR #(S):*

C1057

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	AUTO FLUSH BOLT (HM)	FB31T	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	ELEC LOCKSET (W/ RX)	L9092TEU 06A RX CON 12/24 VDC	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
2	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS401/402CVX	626	IVE
2	EA	SILENCER	SR64	GRY	IVE
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	BY DIV 28		B/O
2	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER WILL  
MOMENTARILY UNLOCK LOCKSET, ALLOWING ACCESS. DOOR REMAINS LOCKED UPON LOSS OF POWER.  
FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 50***FOR USE ON DOOR #(S):*

C1053B

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	SET	AUTO FLUSH BOLT (HM)	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE TRACK CLOSER (W/ STOP)	4040XPT BUMP MC	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	SILENCER	SR64	GRY	IVE
2	EA	DOOR POSITION SWITCH	MS2049F		DET



**HARDWARE GROUP NO. 51***FOR USE ON DOOR #(S):*

C1053A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	SET	AUTO FLUSH BOLT (HM)	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	L9080T 06A	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	ASTRAGAL, OVERLAP	383AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
2	EA	DOOR POSITION SWITCH	MS2049F		DET

**HARDWARE GROUP NO. 52***FOR USE ON DOOR #(S):*

B2000A

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	SET	AUTO FLUSH BOLT (HM)	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	FIRE EXIT HARDWARE	9927-NL-F-LBR-499F	626	VON
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
1	EA	GASKETING	488SBR PSA	BR	ZER
1	EA	GASKETING (MEETING STILE)	8042SBK PSA	BK	ZER

**HARDWARE GROUP NO. 53***FOR USE ON DOOR #(S):*

C1061

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY W/DB & IND	L9496T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 54***FOR USE ON DOOR #(S):*

B1125

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY W/DB & IND	L9496T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP REG MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 54A***FOR USE ON DOOR #(S):*

B1031

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY W/DB & IND	L9496T 06A L583-363	626	SCH
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA MC	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CVX	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**HARDWARE GROUP NO. 55***FOR USE ON DOOR #(S):*

B1003

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-EO	626	VON
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
1	EA	DOOR POSITION SWITCH	MS2049F		DET

**HARDWARE GROUP NO. 56***FOR USE ON DOOR #(S):*

B1000C

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT 24 VDC	626	VON
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	MORTISE CYL HOUSING (FSIC)	26-094 ICX	626	SCH
2	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	BY DIV 28		B/O
2	EA	DOOR POSITION SWITCH	MS2049F		DET

*PANIC DEVICE LATCHES CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICES LATCH AND LOCK WITH ACTIVATION OF SECURITY SYSTEM. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 57***FOR USE ON DOOR #(S):*

B1000D

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-99-DT 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-99-NL 24 VDC	626	VON
1	EA	RIM CYL HOUSING (FSIC)	20-079 ICX	626	SCH
1	EA	MORTISE CYL HOUSING (FSIC)	26-094 ICX	626	SCH
2	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	OH STOP	90S -> @ AUTO OP LEAF	630	GLY
1	EA	SURFACE CLOSER (W/ SPRING STOP)	4040XP SCUSH MC	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC -> FLUSH CEILING MOUNT	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-853T	630	LCN
2	EA	FLUSH MOUNT BOX	8310-867F	689	LCN
1	EA	POWER SUPPLY	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
2	EA	DOOR POSITION SWITCH	MS2049F		DET

*DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER MOMENTARILY RETRACTS PANIC DEVICE LATCH AND MOMENTARILY ENABLES EXTERIOR ACTUATOR BUTTON. PUSHING ENABLED EXTERIOR ACTUATOR BUTTON SIGNALS AUTOMATIC OPERATOR TO MOMENTARILY OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING THE INTERIOR ACTUATOR BUTTON MOMENTARILY RETRACTS PANIC DEVICE LATCH AND SIGNALS AUTOMATIC OPERATOR TO MOMENTARILY OPEN DOOR. PANIC DEVICE LATCHES ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICES LATCH AND LOCK WITH ACTIVATION OF SECURITY SYSTEM. FREE EGRESS AT ALL TIMES.*

**HARDWARE GROUP NO. 58***FOR USE ON DOOR #(S):*

C1013A	C1013B	C1013C	C1014A	C1014B
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*CASED OPEN FRAME/OPENING - NO DOOR OR HARDWARE.***HARDWARE GROUP NO. 59***FOR USE ON ACCESS DOORS AND DOOR #(S):*

A1000B	A1000C	A1000D	A1000E	A1000G	A1000H
A1000J	A1000K	A1003B	C1052B	D1008C	E1009D

*PROVIDE EACH OPENING WITH THE FOLLOWING:*

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	EA	PERMANENT CORE (FSIC EVEREST)	23-030 EV29 T	626	SCH
1	EA	MORTISE CYL HOUSING (FSIC)	26-094 ICX	626	SCH

*VERIFY EXACT CYLINDER TYPE REQUIRED. BALANCE OF HARDWARE BY DOOR MANUFACTURER.*

END OF SECTION

## SECTION 087163 - DETENTION DOOR HARDWARE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes detention door hardware for
  - 1. Swinging detention doors.
  - 2. Sliding detention doors.
  - 3. Key Cabinets
- B. Related Requirements:
  - 1. Section 050553 – “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 2. Section 083119 “Security Access Doors and Frames” for security access doors receiving detention grade locks specified herein.
  - 3. Section 083463 “Detention Doors and Frames” for hinges and door pulls at food pass/cuff ports.
  - 4. Section 087100 “Door Hardware” for commercial hardware at standard hollow metal doors.
  - 5. Section 095753 “Security Ceiling Assemblies” for security ceiling access doors receiving detention grade locks specified herein.
  - 6. Division 28 for security electronic door controls and monitoring.

## 1.3 COORDINATION

- A. Templates: Obtain and distribute, to the parties involved, templates for detention doors, frames, and other work specified to be factory prepared for installing detention door hardware.
- B. Electrical System Roughing-In: Coordinate layout and installation of electrically powered detention door hardware with connections to power supplies, perimeter security system, detention monitoring and control system, fire-alarm system and detection devices and building control system.

## 1.4 PREINSTALLATION MEETINGS

- A. Detention Keying Conference: Conduct conference at Project site. In addition to Owner, Contractor, and Architect, conference participants shall also include Installer. Incorporate detention keying conference decisions into Project's final Detention Keying Schedule after



reviewing detention door hardware keying system including, but not limited to, the following:

1. Preliminary key system schematic diagram.
  2. Requirements for key-control system.
  3. Requirements for access control.
  4. Address for delivery of keys.
- B. Preinstallation Conference: Conduct conference at Project site.
1. Inspect and discuss power and control system roughing-in and other preparatory work performed by other trades.
  2. Review sequence of operation for each type of detention door hardware.
  3. Review and finalize a construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Certifying procedures.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of detention door hardware.
- B. Shop Drawings: For each type of detention door hardware.
1. Include plans, elevations, sections, and attachment details.
    - a. Include attachment details for mounting electric gate locks to insulated sliding and swinging walk-in cooler/freezer doors.
  2. Include diagrams for power, signal, and control wiring; differentiate between manufacturer-installed and field-installed wiring for detention door hardware. Include the following:
    - a. System schematic.
    - b. Point-to-point wiring diagram, including location of connections.
    - c. Riser diagram.
    - d. Elevation of each detention door type.
- C. Detention Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware as well as installation procedures and wiring diagrams. Coordinate the Detention Door Hardware Schedule with detention doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of detention door hardware.
1. Integrate detention door hardware indicated in "Detention Door Hardware Schedule" Article into Project's final Detention Door Hardware Schedule, and indicate complete designations of every item required for each detention door and opening.
  2. Keying Schedule: Coordinate detention keying with other door hardware in Project's final

## Keying Schedule.

3. Indicate each detention lock and type of key cylinder using the following prefixes: "P" for paracentric, "M" for mogul, "HS" for high security, and "C" for commercial.
4. Indicate security level of each item.
5. Submit floor plans for Detention Keying Conference with the Owner identifying Key Codes for each opening scheduled to receive detention hardware. Note proposed keying codes for Paracentric, Mogul and Commercial locks.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer, supplier and Architectural Hardware Consultant.
- B. Product Certificates: For each type of detention door hardware.
  1. Certify that detention door hardware complies with listed fire door assemblies.
- C. Product Test Reports: For each type of detention lock and latch and security door closer, for tests performed by a qualified testing agency.
- D. Examination reports documenting inspections of substrates, areas, and conditions.
- E. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
- F. Field quality-control reports documenting inspections of installed products.
  1. Field quality-control certification signed by Contractor and Detention Equipment Contractor.
- G. Sample Warranties: For special warranties.

## 1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For detention door hardware to include in emergency, operation, and maintenance manuals.
  1. In addition to items specified in Section 017820 "Operation and Maintenance Data," include the following:
    - a. Normal remote security operation.
    - b. Normal local security operation.
    - c. Emergency security operation.
- B. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.

- c. Name of Architect.
  - d. Name of Construction Manager.
  - e. Name of Contractor.
  - f. Date of video recording.
2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.

#### 1.8 MAINTENANCE MATERIAL SUBMITTALS

- 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 detention door hardware.
- B. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of detention door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper detention door hardware operation. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
- C. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Detention Door Hardware: See Detention Hardware Set "S20"
  2. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
  3. Tools: Provide two sets of tools for installing and removing security fasteners.

#### 1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and an authorized representative of detention door hardware manufacturer for installation and maintenance of units required for this Project.
- B. Supplier Qualifications: Detention door hardware supplier with warehousing facilities in Project's vicinity who is, or employs, a qualified Architectural Hardware Consultant or a Detention Hardware Scheduler with a minimum of ten years experience, available during the course of the Work to consult with Contractor, Architect, and Owner about detention door hardware and keying.
  1. Detention Door Hardware Supplier Qualifications: An experienced detention door hardware supplier who has completed projects with electrically powered detention door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

- a. Engineering Responsibility: Prepare data for electrically powered detention door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- b. Scheduling Responsibility: Preparation of Detention Door Hardware and Keying schedules.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Inventory detention door hardware on receipt and provide secure lockup for detention door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the Detention Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver detention door keys to Owner by registered mail or overnight package service.

#### 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of detention door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of operators and detention door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering or detention use.
  - 2. Warranty Period: Three years from date of Substantial Completion.
  - 3. Warranty Period for Security Door Closers: 10 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Swinging Detention Door Assemblies: Provide detention door hardware as part of a detention door assembly that complies with security grade indicated, when tested according to ASTM F 1450, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
  - 1. Tool-Attack Resistance: Comply with small-tool-attack-resistance rating when tested according to UL 1034 and UL 437.

## 2.2 DETENTION DOOR HARDWARE, GENERAL

- A. Provide detention door hardware for each door as scheduled in "Detention Door Hardware Schedule" Article to comply with requirements in this Section.
  - 1. Detention Door Hardware Sets: Provide quantity, item, size, finish, or color indicated.
  - 2. Sequence of Operation: Provide electrically powered detention door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Electrically Powered Detention Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Detention Door Hardware Control and Monitoring: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Section 284619 "PLC Electronic Detention Monitoring and Control Systems."
- D. Source Limitations: Obtain mechanical detention door hardware from same manufacturer as that of electrically powered or pneumatic detention door hardware.
- E. Regulatory Requirements:
  - 1. Fire-Rated Detention Door Assemblies: Provide detention door hardware for 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 NFPA 252 or UL 10C.
  - 2. Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines ICC A117.1.

## 2.3 DETENTION HINGES, GENERAL

- A. Standard for Electric Detention Hinges: UL 634.
- B. Detention Doors with Security Closers: Unless otherwise indicated, provide antifriction-bearing detention hinges.
- C. Detention Hinge Base Metal: Unless otherwise indicated, provide the following:
  - 1. Stainless steel, with stainless-steel pin.
- D. Electrified Functions for Detention Hinges: Comply with the following:
  - 1. Electrical Contact: Exposed electrical contacts for transfer of power.
  - 2. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through detention hinge knuckle.
  - 3. Monitoring: Concealed electrical monitoring switch.
- E. Fastening: Comply with the following:

## 2.4 DETENTION HINGES

- A. Detention Hinges: Heavy weight, anti-friction bearings; fabricated from cast 304 stainless steel; with integral cast anti-shear studs on each leaf, non-removable fully concealed welded in-place stainless steel pins, hospital tips, full mortise.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Northwest Specialty Hardware (NW); Series NW 645 FMST or comparable product by one of the following:
    - a. Brink, R. R. Locking Systems, Inc. (RRB); Model No. 4-1/2-ICS.
    - b. Hager Companies (HAG); Model No. HB9530-IHT-NRP-SH.
    - c. Southern Folger Detention Equipment Company (SF);
      - 1) Folger Adam Model No. 4-1/2FM-ICS,
      - 2) Southern Steel Model No. 204FMSS-ICS.
  - 2. Leaves: Drilled for countersunk security fasteners.
  - 3. Size: Minimum 4-1/2 by 4-1/2 inches by 0.188 inch.
  - 4. Security Grade: 1 according to ASTM F 1758.
  - 5. Finish: BHMA 630.
- B. Food-Pass Detention Hinges: Reference Section 083463 "Detention Doors and Frames".
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Northwest Specialty Hardware (NW); Series NW 631 FPB or comparable product by one of the following:
    - a. Brink, R. R. Locking Systems, Inc. (RRB); Model No. 3FP.
    - b. Southern Folger Detention Equipment Company (SF);
      - 1) Southern Steel Model No. 203FP.

## 2.5 DETENTION LOCKS AND LATCHES, GENERAL

- A. Swinging Detention Door Lock and Latch Performance: Provide detention door locks and latches that comply with security grade indicated, when tested according to ASTM F 1577, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Detention Lock Functions: Provide function numbers and descriptions indicated in detention door hardware sets complying with ASTM F 1577.
- C. Detention Lock Construction: Fabricate detention lock case and cover plate from steel plate. Fabricate bolts from solid sections; laminated construction unacceptable.
- D. Detention Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
  - 1. Latchbolts for Detention Food Pass Doors: Minimum 7/16-inch latchbolt throw.
  - 2. Deadbolts for Security Access Doors: Minimum 5/8-inch latchbolt throw

3. Latchbolts: Minimum 3/4-inch latchbolt throw.
4. Deadbolts: Minimum 1-inch bolt throw.

E. Detention Lock Trim: Levers: Solid stainless steel.

## 2.6 MECHANICAL DETENTION LOCKS AND LATCHES

A. General: Provide mechanical detention lock mountings as follows:

1. Hollow-Metal Detention Doors: Mount detention lock to back of 0.179-inch nominal-thickness steel cover plate for installation in lock pocket fabricated into detention door. Attach cover plate to hollow-metal detention door with security fasteners.

B. Mechanical Deadlock, Paracentric Lever-Tumblers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide R.R. Brink Locking Systems, Inc. (RRB); Series 7080 or comparable product by one of the following:
  - a. Southern Folger Detention Equipment Company (SF);
    - 1) Folger Adam (FA) Series 80-6,
    - 2) Southern Steel (SS); Series 1080A.
2. Deadbolt retracted and extended by paracentric cylinder; keyed one or two sides.
3. Deadbolt: Galvanized steel with 3 hardened steel roller pins; 3/4-inch bolt throw.
4. Paracentric Lever-Tumblers.

C. Mechanical Food Pass Deadlock, Paracentric Lever-Tumblers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide R.R. Brink Locking Systems, Inc. (RRB); Series 7017 or comparable product by one of the following:
  - a. Southern Folger Detention Equipment Company (SF);
    - 1) Folger Adam (FA) Series 10
    - 2) Southern Steel (SS); Series 1010A.
2. Function: Deadbolt retracted by five tumbler paracentric cylinder; keyed one side.
3. Deadbolt: 1 1/2-inch high by 3/4-inch-thick; 5/8-inch throw.
4. Mortise strike with dust box.
5. Security Grade: 1.

## 2.7 ELECTROMECHANICAL DETENTION LOCKS AND LATCHES

A. General: Provide electromechanical detention locks and latches with factory-wired plug connector with 6-inch wire pigtail.

1. Provide security ring for installation of electromechanical detention lock in hollow-metal detention frame, welded to frame or access cover, unless otherwise indicated.

B. Motor-Operated Deadlatches, Mogul:

1. Basis-of-Design Product: Subject to compliance with requirements, provide R.R. Brink Locking Systems, Inc. (RRB); Series 5020M MSLH or comparable product by one of the following:
  - a. Southern Folger Detention Equipment Company (SF);
    - 1) Folger Adam (FA) Series 120MC
    - 2) Southern Steel (SS); Series 10120MC.
2. Function: Remote switch activates electric motor that retracts latchbolt; automatic latching and deadlocking when door is closed (slam locking). Latchbolt can be mechanically retracted by mogul cylinder; keyed one or two sides as scheduled.
  - a. Maintained Switch Latch Holdback (MSLH): Motor revolves half-cycle causing latch to retract (unlock). Under normal operation latchbolt remains retracted until door is opened 2 inches, then motor automatically revolves half cycle again causing latch to extend to the locked position. Under emergency mode, latchbolt remains retracted indefinitely until switch at remote control panel is moved to locked position and activates motor to extend (lock) the latchbolt.
  - b. If power fails, latchbolt automatically deadlocks (fail-secure).
3. Latchbolt: 1-1/2-inch-high by 3/4-inch-thick hardened steel; 1-inch throw.
4. Provide internal deadlock indicator switch.
5. Provide roller-type deadlock actuator.
6. Voltage: 24 VDC.
7. Listed and labeled for use on fire doors.
8. Security Grade: 1.

C. Solenoid-Operated Gate Locks, Paracentric Lever-Tumblers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide R.R. Brink Locking Systems, Inc. (RRB); Series 8050 or comparable product by one of the following:
  - a. Southern Folger Detention Equipment Company (SF);
    - 1) Folger Adam (FA) Series 800
    - 2) Southern Steel (SS); Series 1050D.
2. Function: Remote switch activates solenoid which raises an internal bolt, enabling the door to be opened. Remains unlocked until door is closed, then automatically deadlocks. Bolt may be mechanically retracted by a paracentric key, and remains retracted until key is returned to the locked position; keyed one or two sides as scheduled.
  - a. If power fails, latchbolt automatically deadlocks (fail-secure).
3. Deadbolt: 3/4-inch diameter; 1-inch throw.
4. Provide internal deadlock indicator switch.
5. Voltage: 120-VAC.



6. Security Grade: 1.

## 2.8 ELECTROMECHANICAL LOCKING DEVICES

### A. Sliding Door Operator, Paracentric:

1. Basis-of-Design Product: Subject to compliance with requirements, provide R.R. Brink Locking Systems, Inc. (RRB); Series 57700ECP or comparable product by one of the following:
  - a. Folger Adam (FA) Series D3B.2
  - b. Southern Steel (SS); Series 3165LX

## 2.9 DETENTION OPERATING TRIM

- ### A. Standard: BHMA A156.6, Grade 1.

## 2.10 DETENTION CYLINDERS AND KEYING

- ### A. General: Subject to compliance with requirements, provide cylinders and keying for paracentric and mogul cylinders by the same manufacturer as for detention locks and latches.
- ### B. Paracentric Cylinders: Manufacturer's standard lever-tumbler type, constructed from one-piece spring-tempered brass; with tumblers activated by phosphor bronze springs; five tumblers per lock unless otherwise indicated.
- ### C. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
1. Paracentric cylinders operated by change keys only.
  2. Maxi-Mogul cylinders Master key or grand master key mogul-cylinder locks.
  3. Prepare a proposed keying system to review with owner.
- ### D. Keys: Provide cast silicon-bronze copper alloy keys complying with the following:
1. Stamping: Permanently inscribe each key with a visual key-control number and include the following notation:
    - a. Notation: Information to be furnished by Owner.
  2. Quantity: 3 keys each per Key change and Master Key.
- ### E. Key Cabinet:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix; Model IKC-300 Key Cabinet" or comparable product by one of the following:
    - a. Folger Adam
    - b. Southern Steel (SS)

- c. R.R. Brink Locking Systems, Inc.
- 2. Locations:
  - a. Master Control Room B1016.
  - b. Housing Control Room D1000
  - c. Housing Control Room E1000
- 3. Wall-Mounted High Security Cabinet: Minimum 16 inches wide by 24 inches high by 7 inches deep; formed from 10-gauge steel sheet; prime painted.
  - a. Cabinet Capacity: 300 Keys.
  - b. Two removable swinging panels with key storage racks on each side.
- 4. Lock: Institutional lever tumbler dead bolt
  - a. RRB 7010
  - b. FA 12-6
  - c. SS 1010A

#### 2.11 SWITCHES

- A. General: Provide switches configured with type of contacts required for functions indicated, including multiple circuiting where required by functional performance of Division 28 Section "Video Surveillance."
  - B. Concealed, Magnetic Door Position Switches: Consisting of switch contacts mortised into head of detention door frame and actuating magnet mortised in to the edge of the door; switch fully concealed when door is in closed position; 24 VAC; factory wired with plug connector. Action of door activates switch. Wire in series with lock monitors. Attach with security fasteners.
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide R.R. Brink Locking Systems, Inc. (RRB); Series 201020 or comparable product by one of the following:
    - a. Southern Folger Detention Equipment Company (SF);
      - 1) Folger Adam (FA) Series ASSW-105A
      - 2) Southern Steel (SS); Series 200MRS.

#### 2.12 SECURITY DOOR CLOSERS

- A. Standard: BHMA A156.4, Grade 1.
- 1. Certified Products: Provide security door closers listed in BHMA's "Directory of Certified Products."
- B. Surface-Mounted Security Door Closers:
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. LCN Closers, an Ingersoll-Rand company (LCN); Series 4210.

2. Arms: Minimum 3/8-inch-thick by 1-1/8-inch-wide, rectangular steel main arm; 5/16-inch-thick by 1-inch-wide, rectangular steel secondary arm; full rack-and-pinion type; fabricated with orbital-riveted, pinned, or welded elbow and arm shoe/soffit plate joints designed to prevent disassembly with ordinary hand tools.
3. Cover: Heavy-duty metal, attached with four security fasteners.
4. Mounting: Attach security door closer with security fasteners.

C. Concealed Security Door Closers:

1. Products: Subject to compliance with requirements, provide the following:
  - a. LCN Closers, an Ingersoll-Rand company (LCN); Series 2210.
2. Construction: Forged-steel arm; security roller; with track concealed in head of detention door, designed to eject foreign objects during opening and closing; fabricated with joints designed to prevent disassembly with ordinary hand tools. Closer arm and track fully concealed when door is closed.
3. Cover Plates: Heavy-duty metal, attached with security fasteners.

- D. Unit Size: Unless otherwise indicated, comply with manufacturer's written recommendations for size of security door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.13 DETENTION DOOR STOPS

- A. Detention Door Stops: 3-1/2-inch-high by 2-inch-diameter rubber bumper mounted on steel lag bolt; BHMA A156.16; install in wall with nonshrink grout; for detention doors unless otherwise indicated. Do not mount floor stops where they will impede traffic.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Northwest Specialty Hardware (NW); NW 706 Series.
- B. Silencers for Detention Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 1/2-inch diameter; fabricated for drilled-in application to detention door frame.

2.14 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.
- B. Base Metals: Produce detention door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified detention door hardware units and BHMA A156.18 finishes.

- C. Fasteners: Provide flat-head security fasteners with finished heads to match surface of detention door hardware.
  - 1. Security Fasteners: Fabricate detention door hardware using security fasteners with head style appropriate for fabrication requirements, strength, and finish of adjacent materials. Provide stainless-steel security fasteners in stainless-steel materials.
  - 2. Concealed Fasteners: For detention door hardware units that are exposed when detention door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching detention door hardware. Where using through bolts on hollow-metal detention door and frame construction, provide sleeves for each through bolt.
  - 3. Stainless Steel Machine Screws: For the following fire-rated applications:
    - a. Mortise detention hinges to detention doors.
    - b. Strike plates to detention frames.
    - c. Security door closers to detention doors and frames.
  - 4. Stainless Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
    - a. Surface detention hinges to detention doors.
    - b. Security door closers to detention doors and frames.
  - 5. Spacers Bolts: For through bolting of hollow-metal detention doors.
- D. Detention Lock Construction: Fabricate detention lock case and cover plate from steel plate. Fabricate bolts from solid sections; laminated construction is unacceptable.

## 2.15 HARDWARE FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. BHMA Designations: Comply with base material and finish requirements indicated by the following:
  - 1. BHMA 600: Primed for painting, over steel base metal.
  - 2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
  - 3. BHMA 630: Stainless steel, satin, over stainless-steel base metal.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine detention doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention door hardware connections before detention door hardware installation.
- C. Inspect built-in and cast-in anchor installations, before installing detention door hardware, to verify that anchor installations comply with requirements. Prepare inspection reports.
  - 1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
  - 2. Perform additional inspections to determine compliance of replaced or additional work.
- D. Verify locations of detention door hardware with those indicated on Shop Drawings.
- E. Examine roughing-in for electrical power systems to verify actual locations of connections before detention door hardware installation.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Steel Detention Doors and Frames: Comply with BHMA A156.115 Series.
  - 1. Surface-Applied Detention Door Hardware: Drill and tap detention doors and frames according to SDI A250.6.

## 3.3 INSTALLATION

- A. Mounting Heights: Mount detention door hardware units at heights indicated in DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
  - 1. Door Stops: Install wall-mounted door stops to align with raised pull. Alternative locations as follows:
    - a. Install wall-mounted door stops to align with top leading edge of the door.
    - b. Install wall-mounted door stop to align with bottom leading edge of the door only where there is not a wall surface to install door stop at top edge of the door.
    - c. Install floor-mounted door stop only where a wall surface is not available.
- B. Install each detention door hardware item to comply with Shop Drawings and manufacturer's written instructions. Where cutting and fitting are required to install detention 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. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Install interconnecting wiring and connectors between detention door hardware devices. Terminate device wiring for detention door hardware installed in swinging doors at a plug-type connector located in lock pocket or door frame junction box.
- D. Security Fasteners: Install detention door hardware using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials.

### 3.4 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Perform the following tests and inspections:
1. After installing electrically powered detention door hardware and after electrical circuitry has been energized, test detention door hardware for compliance with requirements.
    - a. Test: Operate lock of each door and group of doors in normal remote, normal local, and emergency operating modes. Verify that remote controls operate correct door locks and in correct sequence.
  2. Verify that lock bolts engage strikes with required bolt projection.
  3. Verify that detention door hardware is installed, connected, and adjusted according to the Contract Documents.
  4. Verify that electrical wiring installation complies with manufacturer's submittal and written installation requirements.
- C. Detention work will be considered defective if it does not pass tests and inspections.
- D. Perform additional inspections to determine compliance of replaced or additional work.
- E. Prepare field quality-control certification endorsed by Detention Specialist that states installed products comply with requirements in the Contract Documents.
- F. Prepare test and inspection reports.

### 3.5 ADJUSTING

- A. Adjust and check each operating item of detention door hardware and each detention door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust detention door-control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

### 3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by detention door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that detention door hardware is without damage or deterioration at time of Substantial Completion.

### 3.7 DEMONSTRATION AND VIDEO RECORDINGS

- A. Train Owner's maintenance personnel to adjust, operate, and maintain detention door hardware and detention door hardware finishes.
- B. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
- C. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.
  1. Submit video recordings thumb drive.
  2. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. Email address.
- D. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- E. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.
- F. Narration: Describe scenes on video recording by dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- G. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- H. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 087163



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**HARDWARE SET S01      CELL DR - SWING**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	ELECT JAMB LOCK	5022M - MSLH - 24VDC	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S01A      CELL DR - SWING w/ FOOD PASS**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
2	EA	FP HINGE	NW631 FPB	USP	NWSH
1	EA	ELECT JAMB LOCK	5022M - MSLH - 24VDC	USP	R R Brink
1	EA	FOOD PASS LOCK	7017	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S01B      S01a w/ CKS**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH by Cell Mfg'r
2	EA	FP HINGE	NW631 FPB	USP	NWSH by Cell Mfg'r
1	EA	ELECT JAMB LOCK	5022M - MSLH - CKS - 24VDC	USP	R R Brink
1	EA	FOOD PASS LOCK	7017	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	WALL STOP - SC	NW 706SC	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S01C      S01B w/ Closer**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
2	EA	FP HINGE	NW631 FPB	USP	NWSH
1	EA	ELECT JAMB LOCK	5022M - MSLH - CKS - 24VDC	USP	R R Brink
1	EA	FOOD PASS LOCK	7017	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S01D            S01C w/o Food Pass**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	ELECT JAMB LOCK	5022M - MSLH - CKS - 24VDC	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S02            Visitation Booth**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	7072 - HM MTG - 7070KD - ESC (1-WAY)	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood

**HARDWARE SET S02A            S02 w/ Food Pass**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
3	EA	FP HINGE	NW631 FPB	USP	NWSH
1	EA	MECH LOCK	7072 - HM MTG - 7070KD - ESC (1-WAY)	USP	R R Brink
1	EA	FOOD PASS LOCK	7017	USP	R R Brink
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood

**HARDWARE SET S02B            S02 w/o Closer**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	7072 - HM MTG - 7070KD - ESC (1-WAY)	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood

**HARDWARE SET S02C            S02 w/ Deadbolt Lock**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	7086 - HM MTG - 7080KD - 2/ESC (1-WAY)	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood

**HARDWARE SET S03            CHASE DOOR**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	DEADBOLT	7012 - HM MTG - 7010KD - ESC (1-WAY)	USP	R R Brink
1	EA	COMBO PULL	NW 701 – TORX-MS	US32D	NWSH
1	EA	WALL STOP	NW706	BLACK	NWSH

**HARDWARE SET S03A            SECURITY ACCESS PANEL**

Each to Receive:

1	EA	DEADBOLT LOCK	7016	USP	R R Brink
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**HARDWARE SET S04            CORRIDOR DOOR - SWING**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	ELECT JAMB LOCK	5026M - MSLH - 24VDC	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	COMBO PULL	NW 701 - TORX MS	US32D	NWSH
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S04a            S04 for Wide Door**

Each to Receive:

4	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	ELECT JAMB LOCK	5026M - MSLH - 24VDC	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	COMBO PULL	NW 701 - TORX MS	US32D	NWSH
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S04A DAYROOM DOOR - SWING**

Each to Receive:

4	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
2	EA	FP HINGE	NW631 FPB	USP	NWSH
1	EA	ELECT JAMB LOCK	5026M - MSLH - 24VDC	USP	R R Brink
1	EA	FOOD PASS LOCK	7017	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	COMBO PULL	NW 701 - TORX MS	US32D	NWSH
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S05 CORRIDOR DOOR - SLIDER**

Each to Receive:

1	EA	LOCKING DEVICE	57700ECP x K2S	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC

**HARDWARE SET S05A S05 for Fire Rated Opening**

Each to Receive:

1	EA	LOCKING DEVICE	57700ECP x K2S	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	FLUSH PULL	BY SECURITY DOOR MFG.	USP	PJBC
3	EA	GASKETING	5050C - 7'	CHAR	NGP
1	EA	SWEEP	601A-50"	AL	NGP
1	EA	SWEEP	602A-50"	AL	NGP

**HARDWARE SET S06 DAYROOM TO DAYROOM**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	ELECT JAMB LOCK	5026M - MSLH - 24VDC	USP	R R Brink
2	EA	COMBO PULL	NW 701 - TORX MS	US32D	NWSH
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
1	EA	THRESHOLD	8135-36" X TORX	AL	NGP
1	SET	GASKETING	5050C - 17'	CHAR	NGP
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S07 STORAGE DOOR - NO MONITORING**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	7086 - HM MTG - 7080KD - 2/ESC (1-WAY)	USP	R R Brink
2	EA	COMBO PULL	NW 701 - TORX-MS	US32D	NWSH
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood

**HARDWARE SET S07A          STORAGE DR W/MONITORING**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	7086 - HM MTG - 7080KS - 2/ESC (1-WAY)	USP	R R Brink
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S08          MECH DOOR w/LABEL**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	1042-401 x LE	26D	R R Brink
1	EA	KEEPER SWITCH	201040	US32D	R R Brink
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S08A          Dutch Door**

Each to Receive:

4	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	SURFACE BOLT	580-8" X Torx MS	US26D	Rockwood
1	EA	MECH LOCK	1022-201 x LE	26D	R R Brink
1	EA	WALL STOP	NW706	BLACK	NWSH
5	EA	LABOR	HOURS		PJBC
2	EA	HANDCUFF RING	NW613WM	US32D	NWSH

**HARDWARE SET S08B          S08 NO MONITORING w/LABEL**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	MECH LOCK	1042-401 x LE	26D	R R Brink
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	WALL STOP	NW706	BLACK	NWSH
3	EA	SILENCERS	608	GREY	Rockwood

**HARDWARE SET S09          EXTERIOR DOOR**

Each to Receive:

3	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
1	EA	ELECT JAMB LOCK	5026M - MSLH - 24VDC	USP	R R Brink
1	EA	LOOP PULL	NW601	US32D	NWSH
1	EA	COMBO PULL	NW 701 - TORX MS	US32D	NWSH
1	EA	CONC CLOSER	2214	AL	LCN
1	EA	FLOOR STOP	NW 606	BLACK	NWSH
1	EA	THRESHOLD	896S-36" X TORX	AL	NGP
1	SET	WEATHERSTRIP	161SA-3070	AL	NGP
1	EA	MAGNETIC DPS	201020	US32D	R R Brink

**HARDWARE SET S10**      **CHAINLINK FENCE GATE**

Each to Receive:

1	EA	ELECT JAMB LOCK	5056M - MSLH – MOG – KCE - 24VDC	USP	R R Brink
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**HARDWARE SET S20**      **SPARE PARTS**

Each to Receive:

6	EA	HINGE	NW645 FMST x #30 Torx	US32D	NWSH
6	EA	ELECT JAMB LOCK	5020M-MSLH - 24VDC	US32D	R R Brink
4	EA	CONC CLOSER	2214	AL	LCN
6	EA	MAGNETIC DPS	201020	US32D	R R Brink
1	SET	SWITCH	6 each type used		R R Brink
4	EA	MOTOR	5020M - 24VDC		R R Brink
2	EA	MOTOR	57700 Gear		R R Brink

## SECTION 088000 - GLAZING

## 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. Glass for:
  - a. Glazing in windows.
  - b. Glazing in door lites.
  - c. Glazing in storefront and curtainwall framing.
  - d. Glazing at entrances and storefront doors.
  - e. Glazing at interior borrow lights and sidelights.
  - f. Glazing sealants and accessories.
  - g. Spandrel glazing.
  - h. Fire-protection rated glazing.

- 2. Glazing sealants and accessories.

- B. Related Requirements:

- 1. Section 084113 "Aluminum-Framed Entrances and Storefront" for glazing within these entrance doors and storefront framing.
- 2. Section 088853 "Security Glazing" for glazing within the secured areas.

## 1.3 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. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.
- E. Insulated Glass Unit & coating orientation
  - 1. Surface 1: Exterior surface of outer lite (surface facing outdoors of outboard lite)



2. Surface 2: Interior surface of outer lite (surface facing indoors of outboard lite)
3. Surface 3: Exterior surface of inner lite (surface facing outboard lite)
4. Surface 4: Interior surface of inner lite (surface facing indoors of inboard lite)

#### 1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of the following products; 12-inches square.
  1. Coated spandrel glass.
  2. Insulating glass.
  3. Laminated glass.
  4. Fire-resistive glass.
- C. Glazing Accessory Samples: For sealants, in 12-inch lengths.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- B. Product Certificates: For glass.
- C. Product Test Reports: For coated glass, insulating glass and glazing sealants, for tests performed by a qualified testing agency.
  1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. 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.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

## 1.8 DELIVERY, STORAGE, AND 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 other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

## 1.9 FIELD 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 are below 40 deg F.

## 1.10 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  - 1. Warranty Period: Ten (10) years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for 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: Ten (10) years from date of Substantial Completion.

- C. Manufacturer's Special Warranty for 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: Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AGC Glass Company North America, Inc.
  2. Cardinal Glass Industries.
  3. Dlubak Corporation.
  4. Guardian Industries Corp.; SunGuard.
  5. Oldcastle BuildingEnvelope™.
  6. PPG Flat Glass; PPG Industries, Inc.
  7. Schott North America, Inc.
  8. Viracon, Inc.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
1. Obtain tinted glass from single source from single manufacturer.
  2. Obtain reflective-coated glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

### 2.2 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. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.
- C. Structural Performance: Glazing shall withstand the code design loads within limits and under conditions indicated determined according to ASCE 7 and ASTM E 1300.
  - 1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
    - a. Wind Design Criteria: As indicated on Drawings.
  - 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
  - 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  - 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  - 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  - 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  - 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing 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.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
  - 1. Minimum Glass Thickness for Exterior and Interior Lites: 6 mm.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. 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 instructions.
  - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
  - 3. Interlayer Color: Clear unless otherwise indicated.

## 2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Spacer: Aluminum with black, color anodic finish.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) Technoform Glass Insulation NA, Inc.; TGI-Spacer.
    - 2) Thermix; a brand of Ensinger USA; Thermix.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

## 2.7 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.
- B. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide SaftiFirst; "SuperLite II SLM45" or a comparable product by one of the following:
    - a. AGC Glass Company North America, Inc. ; Pyrobel
    - b. Pilkington North America; "Pyrostop".
    - c. Technical Glass Products; "Pyrostop".
    - d. Vetrotech Saint-Gobain; "Contraflam".

## 2.8 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 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  2. 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.

## 2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with 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.
  - 1. Provide silicone setting blocks at insulating spandrel glass units. Do not use neoprene blocks.
- 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).

## 2.10 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.
  - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Grind smooth and polish exposed glass edges and corners.

## PART 3 - EXECUTION

### 3.1 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.

### 3.2 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 leave visible marks in the completed Work.

### 3.3 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. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. 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.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. 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.
- G. 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.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.



- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

### 3.4 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, then to jambs. Cover horizontal framing joints by applying tapes to jambs, 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. 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.

### 3.5 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.

### 3.6 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. 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.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces 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.

### 3.7 MONOLITHIC GLASS SCHEDULE

- A. Glass Type **CFG-1**: Clear annealed float glass.
  - 1. Minimum Thickness: 6 mm.
- B. Glass Type **CTG-1**: Clear fully tempered float glass.
  - 1. Minimum Thickness: 6 mm.
  - 2. Safety glazing required.

### 3.8 LAMINATED-GLASS TYPES

- A. Glass Type **LG-1**: Clear laminated glass with two plies of heat-strengthened float glass.
  - 1. Thickness of Each Glass Ply: 3.0 mm.
  - 2. Interlayer Thickness: 0.060 inch (1.52 mm).
  - 3. Provide safety glazing labeling.

### 3.9 INSULATING GLASS SCHEDULE

- A. Glass Type **IG-1**: Low-E-coated, clear insulating glass.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "SuperNeutral 68 Glass" as manufactured by Guardian or comparable product by one of the following:
    - a. AGC Glass Company.

- b. PPG.
    - c. Viracon, Inc.
  - 2. Overall Unit Thickness: 1-inch.
  - 3. Minimum Thickness of Each Glass Lite: 6 mm.
  - 4. Outdoor Lite: Ultraclear fully tempered float glass.
  - 5. Interspace Content: Argon.
  - 6. Indoor Lite: Ultraclear fully tempered float glass.
  - 7. Low-E Coating: Pyrolytic on second surface.
  - 8. Winter Nighttime NFRC U-Factor: U-0.29 maximum.
  - 9. Summer Daytime NFRC U-Factor: U-0.27 maximum.
  - 10. Visible Light Transmittance: 68 percent minimum.
  - 11. Solar Heat Gain Coefficient: SHGC-0.38 maximum.
  - 12. Safety glazing required.
- B. Glass Type **IG-2**: Low-E-coated, spandrel insulating glass.
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide "SuperNeutral 68 Glass" as manufactured by Guardian Industries Corp. or comparable product by one of the following:
    - a. AGC Glass Company.
    - b. Oldcastle BuildingEnvelope™.
    - c. PPG.
    - d. Viracon, Inc.
  - 2. Ceramic Coating Color and Pattern: As selected by Architect from manufacturer's full range.
  - 3. Overall Unit Thickness: 1-inch.
  - 4. Minimum Thickness of Each Glass Lite: 6 mm.
  - 5. Outdoor Lite: Ultraclear fully tempered float glass.
  - 6. Interspace Content: Argon.
  - 7. Indoor Lite: Ultraclear fully tempered float glass.
  - 8. Low-E Coating: Pyrolytic on second surface.
  - 9. Winter Nighttime NFRC U-Factor: U-0.29 maximum.
  - 10. Summer Daytime NFRC U-Factor: U-0.27 maximum.
  - 11. Visible Light Transmittance: 68 percent minimum.
  - 12. Solar Heat Gain Coefficient: SHGC-0.38 maximum.
  - 13. Safety glazing required.
  - 14. Coating Location: Third surface

3.10 FIRE-PROTECTION-RATED GLAZING TYPES

- A. Glass Type **LG-1F**: Laminated Glass with Intumescent Interlayers; 45-minute fire-rated.
  - 1. Total Nominal Thickness: 5/8-inch (16.0 mm).
  - 2. Visible Light Transmittance: 85 percent minimum.
  - 3. Provide safety glazing labeling.

END OF SECTION 088000

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## SECTION 088853 - SECURITY GLAZING

## 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 glass-clad polycarbonate for the following applications:
  - 1. Doors.
  - 2. Interior sidelights and borrowed lites.
  - 3. Detention Windows

## 1.3 DEFINITIONS

- A. Glazing Manufacturers: Firms that produce primary glass, monolithic plastic glazing, or fabricated security glazing, as defined in referenced glazing publications.
- B. Interspace: Space between lites of air-gap security glazing or insulating security glazing.

## 1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on security glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Security Glazing Schedule: List security glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.
- C. Delegated-Design Submittal: For security glazing indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installers.
- B. Product Certificates: For each type of product indicated, from manufacturer.
- C. Product Test Reports: For each type of security glazing, for tests performed by a qualified testing agency.
- D. Product Test Reports: For each type of glazing sealant, for tests performed by a qualified testing agency.
  - 1. Provide test reports based on testing current sealant formulations within previous 36-month period.
- E. Preconstruction adhesion and compatibility test reports.
- F. Sample Warranties: For special warranties.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glazing installers for this Project who are certified under the National Glass Association Glazier Certification Program.
- B. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
  - 1. H. P. White Laboratory, Inc.
  - 2. Underwriters Laboratories, Inc.
  - 3. Wiss, Janney, Elstner Associates, Inc.
- C. Sealant Testing Agency Qualifications: Qualified according to ASTM C 1021 for testing indicated.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect security glazing and glazing materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating security glazing and with air-gap security glazing manufacturers' written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

#### 1.9 FIELD 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.

#### 1.10 WARRANTY

- A. Manufacturer's Special Warranty for Glass-Clad Polycarbonate: Manufacturer agrees to replace glass-clad polycarbonate that deteriorates within specified warranty period. Deterioration of glass-clad polycarbonate is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glass-clad polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.

1. Warranty Period: Five (5) years from date of Substantial Completion.

- B. Manufacturer's Special Warranty on Insulating Security Glazing: Manufacturer agrees to replace insulating security glazing that deteriorates within specified warranty period. Deterioration of insulating security glazing is defined as defects in individual lites developed from normal use or failure of hermetic seal under normal use including:

1. Defects in coated-glass lites include peeling, cracking, and other indications of deterioration in coating.
2. Defects in laminated-glass lites include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
3. Defects in glass-clad polycarbonate lites include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.
4. Evidence of hermetic seal failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glazing.
5. Deterioration does not include defects in individual lites or failure of hermetic seal that is attributed to glass breakage or to maintaining and cleaning insulating security glazing contrary to manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing security glazing products or comparable product by one of the following pre-approved manufacturers:
  1. Other Manufacturers must be pre-approved in writing and any request for pre-approval must include *specific model numbers* for each type, in order to be considered.



- B. Source Limitations for Security Glazing: Obtain security glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each security glazing type indicated.
  - 1. Source Limitations for Tinted Glass: Obtain from single source from single primary glass manufacturer for each tint color indicated.
- C. Source Limitations for Glazing Sealants and Gaskets: Obtain from single source from single manufacturer for each product and installation method.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design security glazing.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

## 2.3 SECURITY GLAZING, GENERAL

- A. Glazing Publications: Comply with published recommendations of security glazing and glazing material 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. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.
- C. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council. Label shall indicate manufacturer's name, type of glazing, glass thickness, and safety glazing standard with which glazing complies.
- D. Ballistics Resistance: Provide glazing materials capable of resisting ballistic impact at levels indicated as determined from testing identical materials according to UL 752.
- E. Attack Resistance: Provide glazing materials capable of resisting attack of type and at security-grade levels indicated as determined from testing identical materials according to ASTM F 1915.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glazing framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- G. Insulating Glazing Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council.
- H. Fire-Test-Response Characteristics of Polycarbonate Sheets: As determined by testing polycarbonate sheets identical to those used in security glazing products by a qualified testing agency acceptable to authorities having jurisdiction.
1. Self-ignition temperature of 650 deg F or more when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.
  2. Smoke-Developed Index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
  3. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.
- I. Thermal and Optical Performance Properties: Provide security glazing with performance properties specified, as indicated in manufacturer's published test data, based on construction products indicated and on procedures indicated below:
1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  2. Solar-Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.4 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
  2. For heat-strengthened float glass, comply with requirements for Kind HS.
  3. For fully tempered float glass, comply with requirements for Kind FT.
  4. For uncoated glass, comply with requirements for Condition A.
- C. Chemically Strengthened Glass: Annealed float glass is chemically strengthened to comply with ASTM C 1422, Surface Compression Level 1 and Case Depth Level.

## 2.5 POLYCARBONATE SECURITY GLAZING

- A. Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II, coated, mar-resistant, UV-stabilized polycarbonate with coating on exposed surfaces and Type I, standard, UV-stabilized polycarbonate where no surfaces are exposed.
- B. Laminated Polycarbonate: Polycarbonate sheets laminated with clear urethane interlayer that complies with ASTM C 1349, Appendix X2, and has a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation. Provide laminated units that comply with requirements of ASTM C 1349 for maximum allowable laminating process blemishes and haze.
- C. Glass-Clad Polycarbonate: ASTM C 1349.

## 2.6 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, 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 security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50 or as required, Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 790.
    - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
    - c. May National Associates, Inc.; Bondaflex Sil 290.
    - d. Pecora Corporation; 890.
    - e. Sika Corporation, Construction Products Division; SikaSil-C990.
    - f. Tremco Incorporated; Spectrem 1.
- C. Security Sealant: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C 920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested according to ASTM C 661.

## 2.7 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 security glazing manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  2. 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.

## 2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of security glazing 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 security glazing manufacturer to maintain security glazing lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit security glazing lateral movement (side walking).

## 2.9 FABRICATION OF SECURITY GLAZING

- A. Fabricate security glazing 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.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing for security glazing, 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 system.
3. Minimum required face or edge clearances.
4. Minimum required bite.
5. Effective sealing between joints of framing members.

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

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving security glazing 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.

### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect edges of security glazing from damage during handling and installation. Remove damaged security glazing from Project site and legally dispose of off Project site. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.
- F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches.
1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. 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 performance requirements.
  2. Provide 1/8-inch minimum bite of spacers on glazing lites and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- G. Provide edge blocking where indicated or needed to prevent security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and according to requirements in referenced glazing publications.
- H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set coated security glazing with proper orientation so that coatings and films face exterior or interior as specified.
- J. 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.
- K. 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.
- L. For fire-rated material, follow manufacturers UL approved "as tested" installation.

#### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by security glazing, 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 just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center security glazing 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.

#### 3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.

- B. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. 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.
  - 1. If, despite such protection, contaminating substances do come into contact with security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.
- C. Wash security glazing 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 security glazing as recommended in writing by security glazing manufacturer.

### 3.6 LAMINATED-GLASS SECURITY GLAZING SCHEDULE

- A. **BR-3M:** Mirrored (one way) laminated bullet-resistant glass.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Secur-Tem + Poly® SP035 Modified".
  - 2. Detention Security Grade: Grade 1, 60-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  - 3. Ballistic Resistance: Level 3, no spall, no penetration according to UL 752.
  - 4. Overall Unit Thickness: 1.39-inches nominal.
  - 5. Outer Ply: 66-mm heat strengthened float one-way mirror glass.
  - 6. Multiple Ply Core: Laminated polycarbonate.
  - 7. Inner Ply: 0.118 Polycarbonate over 6-mm heat strengthened float glass.
  - 8. Interlayer Material: Polyurethane.
  - 9. Interlayer Thickness: 0.050-inch.
  - 10. Minimum Lighting Ratio: 8:1 for one-way mirror effect. Reflective side of unit to be installed facing the Public Lobby.

### 3.7 GLASS-CLAD POLYCARBONATE SECURITY GLAZING SCHEDULE

- A. **GCP-1:** Clear symmetrical glass-clad polycarbonate
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Secur-Tem + Poly® SP028".
  - 2. Detention Security Grade: Grade 1, 60-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  - 3. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
  - 4. Ballistic Resistance: .9-mm, 3 shots in an 8-inch circle, 158 grain lead, 20 feet, Spall with no penetration.
  - 5. Overall Unit Thickness: 0.970-inches nominal.
  - 6. Outer Ply: 3-mm heat strengthened float glass.

7. Multiple Ply Core: Laminated polycarbonate.
  8. Inner Ply: 3-mm heat strengthened float glass.
  9. Interlayer Material: Polyurethane.
  10. Interlayer Thickness: 0.050-inch.
  11. Overall Visible Light Transmittance: 0.67 percent.
- B. **GCP-1M:** Mirrored (one way) symmetrical glass-clad polycarbonate.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Secur-Tem + Poly® SP028".
  2. Detention Security Grade: Grade 1, 60-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  3. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
  4. Ballistic Resistance: .9-mm, 3 shots in an 8-inch circle, 158 grain lead, 20 feet, Spall with no penetration.
  5. Overall Unit Thickness: 0.970-inches nominal.
  6. Outer Ply: 6-mm heat strengthened float one-way mirror glass.
  7. Multiple Ply Core: Laminated polycarbonate.
  8. Inner Ply: 3-mm heat strengthened float glass.
  9. Interlayer Material: Polyurethane.
  10. Interlayer Thickness: 0.050-inch.
  11. Overall Visible Light Transmittance: 0.67 percent.
  12. Minimum Lighting Ratio: 8:1 for one-way mirror effect. Reflective side of unit to be installed facing the inmates.
- C. **GCP-1F:** Clear symmetrical glass-clad polycarbonate; fire-rating as scheduled.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Ultimax 45-SP028F".
  2. Detention Security Grade: Grade 1, 60-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  3. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
  4. Ballistic Resistance: .9-mm, 3 shots in an 8-inch circle, 158 grain lead, 20 ft., no penetration.
  5. Overall Unit Thickness: 1.80-inches nominal.
  6. Outer Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
  7. Multiple Ply Core: Laminated polycarbonate.
  8. Inner Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
  9. Interlayer Material: Polyurethane.
  10. Interlayer Thickness: 0.050-inch.
  11. Overall Visible Light Transmittance: 0.67 percent.
- D. **GCP-1MF:** Mirrored (one way) symmetrical glass-clad polycarbonate, 45-minute fire-rating scheduled.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Ultimax 45-SP028F".



2. Detention Security Grade: Grade 1, 60-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  3. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
  4. Ballistic Resistance: .9-mm, 3 shots in an 8-inch circle, 158 grain lead, 20 ft., no penetration.
  5. Overall Unit Thickness: 1.80-inches nominal.
  6. Outer Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated mirrored glass.
  7. Multiple Ply Core: Laminated polycarbonate.
  8. Inner Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
  9. Interlayer Material: Polyurethane.
  10. Interlayer Thickness: 0.050-inch.
  11. Overall Visible Light Transmittance: 0.67 percent.
  12. Minimum Lighting Ratio: 8:1 for one-way mirror effect. Reflective side of unit to be installed facing the inmates.
- E. **GCP-2:** Clear symmetrical glass-clad polycarbonate.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Secur-Tem + Poly® SP019".
  2. Detention Security Grade: Grade 2, 40-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test
  3. Forced-Entry Resistance: Level III according to HP White-TP-0500.03.
  4. Ballistic Resistance: .38 Special handgun, 3 shots in an 8-inch circle, 158 grain lead, 20 feet; 9-mm handgun, 124 grain lead, FMJ caliber, 25 feet; spall with no penetration.
  5. Overall Unit Thickness: 0.7125-inches nominal.
  6. Outer Ply: 3-mm heat strengthened float glass.
  7. Multiple Ply Core: Laminated polycarbonate.
  8. Inner Ply: 3-mm heat strengthened float glass.
  9. Interlayer Material: Polyurethane.
  10. Interlayer Thickness: 0.05-inch.
  11. Overall Visible Light Transmittance: 0.73 percent.
- F. **GCP-2M:** Mirrored (one way) symmetrical glass-clad polycarbonate.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Secur-Tem + Poly® SP019M".
  2. Detention Security Grade: Grade 2, 40-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  3. Forced-Entry Resistance: Level III according to HPW-TP-0500.02.
  4. Ballistic Resistance: .38 Special handgun, 3 shots in an 8-inch circle, 158 grain lead, 20 feet; 9-mm handgun, 124 grain lead, FMJ caliber, 25 feet; spall with no penetration.
  5. Overall Unit Thickness: 0.81-inches nominal.
  6. Outer Ply: 6-mm heat strengthened float one-way mirror glass.
  7. Multiple Ply Core: Laminated polycarbonate.
  8. Inner Ply: 3-mm heat strengthened float glass.
  9. Interlayer Material: Polyurethane.

10. Interlayer Thickness: 0.05-inch.
  11. Overall Visible Light Transmittance: 0.73 percent.
  12. Minimum Lighting Ratio: 8:1 for one-way mirror effect. Reflective side of unit to be installed facing the inmates.
- G. **GCP-2F:** Clear symmetrical glass-clad polycarbonate; 45-minute fire-rating as scheduled.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Ultimax 45- SP019G.
  2. Detention Security Grade: Grade 2, 40-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  3. Forced-Entry Resistance: Level III according to HPW-TP-0500.02.
  4. Ballistic Resistance: .38 Special handgun, 3 shots in an 8-inch circle, 158 grain lead, 20 feet; 9-mm handgun, 124 grain lead, FMJ caliber, 25 feet; spall with no penetration.
  5. Fire Resistance: UL-10C 45 Minute Fire-Rated, no wire.
  6. Overall Unit Thickness: 1.560-inches nominal.
  7. Outer Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
  8. Multiple Ply Core: Laminated polycarbonate.
  9. Inner Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
  10. Interlayer Material: Polyurethane.
  11. Interlayer Thickness: 0.050-inch.
  12. Overall Visible Light Transmittance: 0.73 percent.
- H. **GCP-2MF:** Mirrored (one way) symmetrical glass-clad polycarbonate, 45-minute fire-rating scheduled.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Ultimax 45 SP019G with Mirrorpane".
  2. Detention Security Grade: Grade 2, 40-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
  3. Forced-Entry Resistance: Level III according to HPW-TP-0500.02.
  4. Ballistic Resistance: .38 Special handgun, 3 shots in an 8-inch circle, 158 grain lead, 20 feet; 9mm handgun, 124 grain lead, FMJ caliber, 25 feet; spall with no penetration.
  5. Fire resistance: UL 10C 45 minute fire-rated, no wire.
  6. Overall Unit Thickness: 1-13/16-inch nominal.
  7. Outer Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated mirrored glass.
  8. Multiple Ply Core: Laminated polycarbonate.
  9. Inner Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
  10. Interlayer Material: Polyurethane.
  11. Interlayer Thickness: 0.05-inch.
  12. Overall Visible Light Transmittance: 0.73 percent.
  13. Minimum Lighting Ratio: 8:1 for one-way mirror effect. Reflective side of unit to be installed facing the inmates.
- I. **GCP-3:** Clear symmetrical glass-clad polycarbonate.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Secur-Tem + Poly® 2116".

2. Detention Security Grade: Grade 3, 20-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
3. Forced-Entry Resistance: Level II according to HPW-TP-0500.02.
4. Ballistic Resistance: .38 Special handgun, 3 shots in an 8-inch circle, 158 grain lead, 20 feet; 9-mm handgun, 124 grain lead, FMJ caliber, 25 feet; spall with no penetration.
5. Overall Unit Thickness: 0.7245- inch nominal.
6. Outer Ply: 3-mm heat strengthened float glass.
7. Multiple Ply Core: Laminated polycarbonate.
8. Inner Ply: 3-mm heat strengthened float glass.
9. Interlayer Material: Polyurethane.
10. Interlayer Thickness: 0.050-inch.

J. **GCP-3F:** Clear symmetrical glass-clad polycarbonate; 45-minute fire-rating as scheduled.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "Ultimax 45-2116G".
2. Detention Security Grade: Grade 3, 20-minute physical attack according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impact test.
3. Forced-Entry Resistance: Level II according to HPW-TP-0500.02.
4. Ballistic Resistance: .38 Special handgun, 3 shots in an 8-inch circle, 158 grain lead, 20 feet; 9-mm handgun, 124 grain lead, FMJ caliber, 25 feet; spall with no penetration.
5. Fire Resistance: UL-10C 45 Minute Fire-Rated, no wire.
6. Overall Unit Thickness: 1.572-inch.
7. Outer Ply: "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
8. Multiple Ply Core: Laminated polycarbonate.
9. Inner Ply: 3-mm "Inferno-Lite or Inferno-Lite Ultimax" fire-rated glass.
10. Interlayer Material: Polyurethane.
11. Interlayer Thickness: 0.050-inch.
12. Overall Visible Light Transmittance: 0.77 percent.

3.8 LAMINATE POLYCARBONATE GLAZING

A. **LP-3:** Clear laminated polycarbonate.

1. Basis-of-Design Product: Subject to compliance with requirements, provide "Lexgard MPC 375" as manufactured by Global Security Glazing or a comparable product.
2. Detention Security Grade: Grade 3, 20-minute physical attack, according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impactor test.
3. Forced-Entry Resistance: Level II according to HPW-TP-0500.02.
4. Overall Unit Thickness: 3/8- inch nominal.
5. U-Value: .84.
6. Shading Co-efficient: .92.
7. Light Transmission: .77.

### 3.9 SECURITY INSULATING GLASS TYPES

- A. **SIG-1:** 60-minute Low-E-coated, clear insulating glass-clad polycarbonate unit.
1. Basis-of-Design Product: Subject to compliance with requirements, provide "SP028IG (Secur-Tem + Poly SP028)" as manufactured by Global Security Glazing.
  2. Detention Security Grade: Grade 1, 60-minute physical attack, according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impactor test.
  3. Forced-Entry Resistance: Level IV according to HPW-TP-0500.02.
  4. Overall Unit Thickness: 1.590-inches nominal.
  5. Outdoor Lite: Clear fully tempered float glass with Low Emissive Coating on the No. 2 surface.
  6. Interspace Content: Argon.
  7. Interspace Dimension: 0.375-inches.
  8. Indoor Lite: Glass-clad polycarbonate GCP-1.
  9. Low-E Coating: Soft-coat on second surface. Verify performance calculations once type of low e coating has been selected by others.
  10. Solar Heat Gain Co-efficient: .27.
  11. Light Transmission: .59.
- B. **SIG-2:** 40-minute Low-E-coated, clear insulating glass-clad polycarbonate unit.
1. Basis-of-Design Product: Subject to compliance with requirements, provide "SP019IG (Secur-Tem + Poly SP019)" as manufactured by Global Security Glazing.
  2. Detention Security Grade: Grade 2, 40-minute physical attack, according to ASTM F 1915 cold-temperature impact test, warm-temperature impact test and torch and small blunt impactor test.
  3. Overall Unit Thickness: 1.367-inches nominal.
  4. Outdoor Lite: Clear fully tempered float glass with Low Emissive Coating on the No. 2 surface.
  5. Interspace Content: Argon.
  6. Interspace Dimension: 0.375-inch.
  7. Indoor Lite: Glass-clad polycarbonate GCP-2.
  8. Low-E Coating: Soft-coat on second surface. Verify performance calculations once type of low e coating has been selected by others.
  9. U-Value: .27.
  10. Solar Heat Gain Co-efficient: .27.
  11. Light Transmission: .59.

### 3.10 Special Considerations

- A. Impact Test Criteria - ASTM F 1915 Standard Test Methods for Glazing for Detention Facilities.
1. Security Grade 1: 60 minutes.
  2. Security Grade 2: 40 minutes.
  3. Security Grade 3: 20 minutes.
  4. Security Grade 4: 10 minutes.

- B. Glass Stop Height: Provide 1/4-inch edge plus 1-inch bite.

END OF SECTION 088853

## SECTION 089119 - FIXED LOUVERS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Fixed, all extruded-aluminum louvers.

## 1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- D. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain-performance, as determined by testing according to AMCA 500-L.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
  - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
  - 2. Show mullion profiles and locations.
- C. Samples: For each type of metal finish required.

- D. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.
- B. Windborne-debris-impact-resistance test reports.

#### 1.6 QUALITY ASSURANCE

- A. Comply with the Buy American Act (41 U.S.C. 10).
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

#### 1.7 FIELD CONDITIONS

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

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
- C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. Component Importance Factor: 1.25.
- D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- F. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

## 2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Drainable-Blade Louver:
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Stationary Louver Drainable Blade model ESD-403 as manufactured by Greenheck Fan Corporation or comparable product by one of the following:
    - a. Air Flow Company, Inc.
    - b. Carnes Company, Inc.
    - c. Construction Specialties, Inc.
    - d. Nystrom, Inc.
    - e. Reliable Products, Inc.
    - f. Ruskin Company; Tomkins PLC.
  2. Louver Depth: 4-inches.
  3. Blade Profile: Plain blade without center baffle.
  4. Frame and Blade Nominal Thickness: Not less than 0.081-inch.
  5. Louver Performance Ratings:
    - a. Free Area: Not less than indicated on schedule.
    - b. Point of Beginning Water Penetration: Not less than 1000 fpm.
    - c. Air Performance: As scheduled at maximum CFM.
  6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
- B. Finish/Colors:
  1. High-performance organic finish. Custom Color as selected by Architect to match aluminum storefront.

## 2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.



1. Screen Location for Fixed Louvers: Interior face.
  2. Screening Type: Bird screening.
- B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6-inches from each corner and at 12-inches o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
  2. Finish: Mill finish unless otherwise indicated.
  3. Type: Re-wirable frames with a driven spline or insert.
- D. Louver Screening: Bird Screening: Aluminum, ½-inch square mesh, 0.063-inch wire.

## 2.5 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
  2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
  3. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Post-installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.6 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
1. Frame Type:
    - a. Channel at masonry walls.

- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72-inches o.c., whichever is less.
  - 1. Where exposed mullions are required, provide units with exposed mullions of same width and depth as louver frame.
- F. Provide sub-sills made of same material as louvers for recessed louvers.
- G. Join frame members to each other and to fixed louver blades with fillet welds unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

## 2.7 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Color and Gloss: Custom color as selected by Architect to match aluminum storefront color.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

### 3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weather-tight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

### 3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
  - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

## SECTION 092216 - NON-STRUCTURAL METAL FRAMING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Non-load-bearing steel framing systems for interior partitions.
  - 2. Suspension systems for interior ceilings and soffits.
- B. Related Requirements:
  - 1. Section 054000 - "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.
  - 2. Section 092900 – "Gypsum Board" for a component of the wall assembly attached to metal framing.

## 1.3 ACTION SUBMITTALS

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

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

## 2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G60, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.
  - 1. Steel Studs and Tracks:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      - 1) ClarkDietrich.
      - 2) MarinoWARE.
    - b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
    - c. Depth: As indicated on Drawings.
  - 2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
    - a. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
    - b. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
  - 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) ClarkDietrich.
      - 2) MarinoWARE.

2. Single Long-Leg Track System: ASTM C 645 top track with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  3. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
  4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) ClarkDietrich.
      - 2) MarinoWARE.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. ClarkDietrich.
    - b. MarinoWARE.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: 0.0296 inch.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.
1. Depth: As indicated on Drawings.
  2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.0296 inch.
  2. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical or hat shaped.

- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
  1. Depth: 3/4-inches.
  2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
  3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

## 2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Hanger Attachments to Concrete:
  1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or AC193 as appropriate for the substrate.
    - a. Uses: Securing hangers to structure.
    - b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
  1. Depth: As indicated on Drawings.
- E. Furring Channels (Furring Members):
  1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
  2. Steel Studs and Tracks: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.0296 inch.
    - b. Depth: As indicated on Drawings.
  3. Embossed Steel Studs and Tracks: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.0190 inch.
    - b. Depth: As indicated on Drawings.
  4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

- a. Minimum Base-Metal Thickness: 0.0296 inch.
- 5. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
  - a. Configuration: Asymmetrical or hat shaped.
- F. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Armstrong World Industries, Inc.
    - b. Chicago Metallic Corporation.
    - c. USG Corporation.

## 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
  - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8-inch thick, in width to suit steel stud size.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION



- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Single-Layer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
  - 2. Multilayer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
  - 3. Tile Backing Panels: As required by horizontal deflection performance requirements unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
  5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
1. Screw to metal framing.
  2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

### 3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: 48-inches o.c.
  2. Carrying Channels (Main Runners): 48-inches o.c.
  3. Furring Channels (Furring Members): 16-inches Insert dimension o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  5. Do not attach hangers to steel roof deck.
  6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8- inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

## SECTION 092900 - GYPSUM BOARD

## 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. Interior gypsum board.
  - 2. Tile backing panels.
  - 3. Trim accessories.
- B. Related Requirements:
  - 1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For the following products:
  - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
- C. Samples for Verification: For the following products:
  - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

## 1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Build mockups for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
    - b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install 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.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

#### 2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

## 2.3 INTERIOR GYPSUM BOARD

### A. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. CertainTeed Corporation.
  - b. Georgia-Pacific Gypsum LLC.
  - c. National Gypsum Company.
2. Thickness: 5/8-inch.
3. Long Edges: Tapered.

### B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. American Gypsum.
  - b. CertainTeed Corporation.
  - c. Georgia-Pacific Gypsum LLC.
2. Thickness: 1/2-inch.
3. Long Edges: Tapered.

### C. Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. CertainTeed Corporation.
  - b. Georgia-Pacific Gypsum LLC.
  - c. National Gypsum Company.
2. Core: 5/8-inch, Type X.
3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
4. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
6. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements according to test in Annex A1.
7. Long Edges: Tapered.
8. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- D. Mold-Resistant Gypsum Board Type "X": ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Georgia-Pacific Gypsum LLC.
    - c. National Gypsum Company.
    - d. United States Gypsum Company.
  2. Core: 5/8-inch.
  3. Long Edges: Tapered.
  4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

## 2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Georgia-Pacific Gypsum LLC.
    - c. National Gypsum Company.
    - d. United States Gypsum Company.
  2. Thickness: 5/8-inch.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

## 2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
  2. Shapes:
    - a. Cornerbead.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - c. L-Bead: L-shaped; exposed long flange receives joint compound.
    - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - e. Expansion (control) joint.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Fry Reglet Corporation.
  - b. Gordon, Inc.
  - c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Drywall Molding End Closure:
  - a. Basis-of-Design Product: Model "DMEC" end closure as manufactured by Frye Reglet or a comparable product.
  - b. Dimensions: Custom; 9-inches by 7/8-inch.
  - c. Locations: At all gypsum board column enclosures located at perimeter storefront/curtainwall as shown on drawings.
  - d. Finish: Custom factory-painted, baked-enamel finish. Color to match adjacent aluminum storefront framing.
4. Drywall Molding Z-Reveal:
  - a. Basis of Design Product: Model "DRMZ-625-50" "Z" Reveal Moulding as manufactured by Frye Reglet or a comparable product.
  - b. Dimensions: 1/2-inch wide x 5/8-inch deep reveal.
  - c. Locations: Perimeter reveal between ground face CMU base and gypsum board.
  - d. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.
5. Reveal Molding:
  - a. Basis of Design Product: Model "DRM-625-75" "Reveal Molding as manufactured by Frye Reglet or a comparable product.
  - b. Dimensions: 3/4-inch wide x 5/8-inch deep reveal.
  - c. Location: Fallen Officer display wall at Lobby.
  - d. Finish: Clear anodized alloy aluminum 6063 T5.
6. Reveal Picture Hanger:
  - a. Basis of Design Product: Model "DRMH--50" "Reveal/Picture Hanger as manufactured by Frye Reglet or a comparable product.
  - b. Dimensions: 3/4-inch wide x 1/2-inch deep reveal.
  - c. Locations: Fallen Officer display wall at Lobby.
  - d. Finish: Clear anodized alloy aluminum 6063 T5.
7. Hook Insert:
  - a. Basis-of-Design Product: Model "IFRHOOKINSERT Hook Insert" as manufactured by Frye Reglet or a comparable product.
  - b. Dimensions: 1-inch wide x 9/16-inch high lip.



- c. Locations: Memorial wall
- d. Finish: Clear anodized alloy aluminum 6063 T5.

C. Acoustic Compression Seal:

- 1. Product: Provide an acoustic compression seal; Model "QTT" as manufactured by Nystrom or a comparable product.
- 2. Location: At the 1-inch gap between the partition wall end closure and storefront/curtainwall framing.
- 3. Material: Fire-retardant silicone with foam sealant.
- 4. Dimensions: Refer to drawings for size.
- 5. Color: As selected by the Architect from manufacturer's standard colors.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

- 1. Interior Gypsum Board: Paper.
- 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

- 1. Prefilling: At open joints, rounded or beveled panel edges, 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 drying-type, all-purpose compound.
  - a. Use setting-type compound for installing paper-faced metal trim accessories.
- 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
- 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

- 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
- 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
- 3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

- B. 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.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Thermal Insulation: As specified in Section 072100 - "Thermal Insulation."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- 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.

#### 3.2 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 other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

### 3.4 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.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use at exposed panel edges.
- D. Exterior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use at exposed panel edges.

### 3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, 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, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive 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. Level 4: At all skylight shaft walls.

### 3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. 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 092900

## SECTION 093000 - TILING

## 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. This Section includes the following:
  - 1. Porcelain tile for Rest Room walls and floors.
- B. Related Sections include the following:
  - 1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

## 1.3 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- D. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required.
  - 2. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches (300 mm) square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.

3. Full-size units of each type of trim and accessory.

- E. Qualification Data: For Installer.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

- C. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects.

1. Build mockup of wall tile installation.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include the manufacturers specified.

### 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements, unless otherwise indicated.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Colors, Textures, and Patterns: From manufacture's standard selection.
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

## 2.3 TILE PRODUCTS

- A. Ceramic Wall Tile: Basis of Design- Stonepeak High-Tech Porcelain.

- 1. Ceramic Wall and Floor Tile:
  - a. Style: Quartzite.
  - b. Type: Porcelain.
  - c. Application: Floor and Walls.
- 2. Or pre-approved equal by:
  - a. American Olean; Div. of Dal-Tile International Corp.
  - b. Crossville Ceramics Company, L.P.
  - c. Daltile.
  - d. Florida Tile Industries, Inc.
  - e. Royal Mosa Tiles
- 3. Technical Data:
  - a. Water Absorption: ASTM C373 < 0.1%.
  - b. Breaking Strength: ASTM C648 > 400 lbs.
  - c. Scratch Hardness: MOHS > 7.0.
  - d. Chemical Resistance: ASTM C650 Unaffected.
  - e. Bond Strength: > 200 psi.
- 4. Shower Wall Size: 12 x 12-inches.
  - a. Thickness: 1/3-inch.
- 5. Show Floor Size: 2 x 4-Inches.
  - a. Thickness: 1/3-inch.
- 6. Restroom Floor Size: 12 x 12-inches.



- a. Thickness: 1/3-inch.
- 7. Base: Bullnose 3 x 12
- 8. Edge: Rectified.
- 9. Finish: Matt.
- B. Trim:
  - 1. Provide necessary caps, stops, returns, trimmers and other shapes to complete installation.
  - 2. Color and finish: aluminum.
- C. Accessories:
  - 1. Base:
    - a. Schluter Systems LP.
  - 2. Option:
    - a. Custom Building Products
    - b. Blanke and Co.
    - c. Dural USA, Inc.

## 2.4 TILING AND GROUTING MATERIALS

- A. Manufacturers:
  - 1. Bonsal, W. R., Company.
  - 2. Bostik.
  - 3. DAP, Inc.
  - 4. LATICRETE International Inc.
  - 5. MAPEI Corporation.
  - 6. TEC Specialty Products Inc.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
  - 1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
  - 2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
    - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
- C. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.

## 2.5 MISCELLANEOUS MATERIALS

- A. Trowelable Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

- 1. Products:

- a. Bonsal, W. R., Company; Grout Sealer.
  - b. Bostik; CeramaSeal Grout Sealer.
  - c. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
  - d. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
  - e. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
  - f. TEC Specialty Products Inc.; TA-256 Penetrating Silicone Grout Sealer.
  - g. Miracle

- D. Joint Compound for Tile Backing Panels:

- 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

## 2.6 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
  2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
  3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Align joints when adjoining tiles on walls and trim are same size. Lay out tile work and center tile fields in both directions on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Provide 6" tall bull nose tile at exposed edge of wall tiles and at top of wainscot of tiled walls.

- G. Provide a 6" tall coved base tile on walls with ceramic wall tile.
- H. If tile ends in middle of wall, rather than wall to wall, provide end bull nosed tile.
- I. Grout tile to comply with requirements of the following tile installation standards:
  - 1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

### 3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

### 3.5 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with joint width of 1/16-inch.

### 3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- B. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

### 3.7 WALL TILE INSTALLATION SCHEDULE

- A. Tile Installation: Interior wall installation over cementitious backer units; thin-set mortar; TCA W244 and ANSI A108.5.
  - 1. Tile Type: Porcelain Wall and Floor tile.
  - 2. Thin-Set Mortar: Latex- portland cement mortar.  
Grout: Sand-portland cement grout.
  - 3. Colors: As selected by the Architect from manufacturer's full range.
  - 4. Pattern to be determined.

5. Tile will be full height on showers walls.
6. Sizes: 12" x 12".
7. Provide base trim.

END OF SECTION 093000

## SECTION 095113 - ACOUSTICAL PANEL CEILINGS

## 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 acoustical panels, decorative clouds and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
  - 1. Acoustical Panels: Set of 6-inch- square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.
  - 3. Clips: Full-size hold-down clips.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Ceiling suspension-system members.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:
  - a. Lighting fixtures.
  - b. Diffusers.
  - c. Grilles.
  - d. Speakers.
  - e. Sprinklers.
  - f. Access panels.
  - g. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
8. Minimum Drawing Scale: 1/8-inch = 1 foot.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

#### 1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
3. Hold-Down Clips: Equal to 2 percent of quantity installed.
4. Extra materials are not to be used for corrective work nor punch list work

#### 1.7 QUALITY ASSURANCE

A. ASTM International (ASTM):

1. ASTM A641/A641M Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

2. ASTM B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
3. ASTM C634 Standard Terminology Relating to Building and Environmental Acoustics.
4. ASTM C636/C636M Standard Specification for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
5. ASTM E488/E488M Standard Test Methods for Strength of Anchors in Concrete Elements.
6. ASTM E580/E580M Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions<sup>11</sup>.
7. ASTM E1190 Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

#### 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

### PART 2 - PRODUCTS

#### 2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
  1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4-inches away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.



- C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

## 2.2 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

## 2.3 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Class A according to ASTM E 1264.
  - 2. Smoke-Developed Index: 50 or less.

## 2.4 ACOUSTICAL PANELS

- A. **ACT1:** Acoustical Ceiling Panel: Wet-formed mineral fiber substrate acoustical panel for general use in offices, conference rooms, corridors and lobby areas.
  - 1. Basis-of-Design Product: USG Corporation "Ultima Millennia ClimaPlus" or comparable product by one of the following:
    - a. Armstrong World Industries, Inc.
    - b. Chicago Metallic Corp.
    - c. Hunter Douglas.
  - 2. Special Considerations:
    - a. 24 x 24-inches ceiling panel.
    - b. Class A (UL) fire rating.
    - c. Classification: Provide panels complying with ASTM E 1264 for type, form and pattern as follows:
      - 1) Type and Form: Type III, mineral base with painted finish; Form 1 or 2.
      - 2) Pattern G (Smooth).
      - 3) Light reflectance: Not less than 0.85.
      - 4) Noise reduction coefficient (NRC): Not less than 0.65.
      - 5) Sound blocking (CAC): 35.
      - 6) Color: White.
      - 7) Edge/Joint Detail: Square.
      - 8) Edge/Joint Detail at Training Room C1034: Shadowline.

9) Thickness: 3/4-inch.

B. **ACT2:** Acoustical Ceiling Panel: Wet-formed mineral fiber substrate, washable, water repellent, scratch and soil resistant finish for restrooms and utility areas applications.

1. Basis of Design Product: USG Corporation "Kitchen Lay-In ClimaPlus" or comparable product by one of the following:

- a. Armstrong World Industries, Inc.
- b. USG Corp.
- c. Chicago Metallic Corp.
- d. Hunter Douglas.

2. Special Considerations:

- a. 24 x 24-inches ceiling panel.
- b. Class A (UL) fire rating.
- c. Classification: Provide panels complying with ASTM E 1264 for type, form and pattern as follows:
  - 1) Type and Form: Type III, mineral base with painted finish; Form 1 or 2.
  - 2) Pattern G (Smooth).
  - 3) Light reflectance: Not less than 0.85.
  - 4) Noise reduction coefficient (NRC): Not less than 0.65.
  - 5) Sound blocking (CAC): 35.
  - 6) Color: White.
  - 7) Edge/Joint Detail: Square.
  - 8) Thickness: 3/4-inch.

## 2.5 METAL SUSPENSION SYSTEM

A. Basis-of Design Product: Subject to compliance with requirements, provide "DX/DXL 26 Donn" as metal suspension system as manufactured by USG Corporation or a comparable product, but are not limited to the following:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Chicago Metallic Corporation.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) type.

3. Face Design: Flat, flush.
4. Cap Material: Cold-rolled steel or aluminum.
5. Cap Finish: Painted white.

## 2.6 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
  1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hold-Down Clips: Manufacturer's standard hold-down.

## 2.7 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, provide edge trim products "Decorative Clouds" by USG Corporation or a comparable product by one of the following:
  1. Armstrong World Industries, Inc.
  2. CertainTeed Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
  1. Trim Profiles:
    - a. Size: 8-inches by 3/4-inches.
  2. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
  3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

### 3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

7. Do not attach hangers to steel deck tabs.
  8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  9. Space hangers not more than 48-inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8-inches from ends of each member.
  10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.
  2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  3. Install hold-down clips in all vestibules and kitchen as indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
    - a. Hold-Down Clips: Space 24-inches o.c. on all cross runners.
  4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

### 3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8-inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8-inch in 12 feet, non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

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## SECTION 095753 - SECURITY CEILING ASSEMBLIES

## 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

- B. Section Includes:

- 1. Downward-locking-panel security ceiling assemblies.
- 2. Medium Grade security-plank security ceiling assemblies.
- 3. Ceiling security access doors mounted in security ceiling assemblies.

- C. Related Requirements:

- 1. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
- 2. Section - "Detention Door Hardware" for detention grade locks for security ceiling access doors provided by this section.
- 3. Divisions 21, 22, 23, 26, and 28 Sections for mechanical and electrical work penetrating security ceiling systems or requiring access above the ceiling.

## 1.3 COORDINATION

- A. Coordinate layout and installation of security ceiling assemblies with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

- 1. Verify location of access doors required by plumbing, HVAC, electrical and security systems contractors requiring access to devices located above the security ceiling.

## 1.4 ACTION SUBMITTALS

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

- B. Samples for Verification: For the following products, of size indicated below:

- 1. Security Ceiling Panel Units: Full cross section by 12-inches long for each type of panel.
- 2. Perimeter Supports, Closures, and Exposed Molding: 12-inches long for each type.
- 3. Suspension System: 12-inches long.



## 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans drawn, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Layout of panels, joint pattern, transitions.
  - 2. Suspension system members.
  - 3. Method of attaching hangers to building structure.
  - 4. Size and location of ceiling access doors.
  - 5. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access doors, and special moldings.
- B. Qualification Data: For Installer.
- C. Welding certificates.
- D. Product Test Reports: For each security ceiling assembly, for tests performed by a qualified testing agency.
- E. Attachment Device Test Reports: Indicating capability to sustain, without failure, load indicated without pulling out from substrate.
- F. Other Informational Submittals:
  - 1. Examination reports documenting inspection of substrates, areas, and conditions.
  - 2. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
  - 3. Field quality-control certification signed by Contractor.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Security Ceiling Panels: Full-size units equal to 2.0 percent of amount installed.
  - 2. Suspension System Components: Quantity of each grid and exposed component equal to 2.0 percent of amount installed.
  - 3. Security Fasteners: Furnish not less than 1 box for each 50 boxes or fraction thereof, of each type and size of security fastener installed.
  - 4. Tools: Provide two sets of tools for installing and removing security fasteners, packaged for easy handling and storage.

## 1.7 QUALITY ASSURANCE

- A. Manufacturers shall have a minimum of five (5) years experience successfully producing security ceiling systems of the types and sizes required in the contract documents. Upon request the manufacturer shall provide a list of successfully completed projects and the dates they were completed.

- B. Manufacturers shall be ISO 9001:2008 certified and shall be required to present their Certificate of Registration upon request. The manufacturer's registrar shall be nationally recognized and shall provide the manufacturer with periodic factory follow up audits reaffirming the manufacturer's continuing compliance with their written quality program.
- C. Subcontractor (DEC) qualifications.
  - 1. Technically qualified and experienced in furnishing and installing detention security acoustical panel.
  - 2. Welders and tackers shall be qualified by the American Welding Society's procedure AWS D1.3.
  - 3. Has full time employees with a minimum of five (5) years experience in furnishing and installing detention equipment and detention security systems.
  - 4. Direct distributor or dealer for the manufacturer of detention security acoustical panel system specified or approved.
  - 5. Submit evidence of prior experience in the installation of metal security ceiling systems.
- D. Quality Criteria.
  - 1. All ceiling construction shall be in accordance with construction of assemblies which meet the testing requirements of Section 1. 5.
  - 2. Fabrication methods and product quality shall meet standards specified herein.
  - 3. Job Site Check
    - a. At the owner's option, a ceiling panel at the job site shall be selected at random and sawed in half or otherwise taken apart as deemed necessary for verification that construction is in accordance with these specifications. The manufacturer shall include the cost of the replacement panel in their quotation. If the panel construction does not conform to these specifications the non-conforming panels shall be repaired or replaced at the manufacturer's expense.
- E. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
  - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum".
  - 3. AWS D1.3, "Structural Welding Code - Sheet Steel".
  - 4. AWS D1.6, "Structural Welding Code – Stainless-Steel".
- F. Preinstallation Conference: Conduct conference at Project Site.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver security metal ceiling panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Handle security metal ceiling panels, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.

#### 1.9 WARRANTY

- A. All ceiling systems work shall be warranted from defects in workmanship and quality for a period of one (1) year after Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Security ceiling assemblies shall withstand normal thermal movement and structural loads without failure, including permanent deformation of security ceiling assembly components including pans and suspension system; noise or metal fatigue caused by vibration, deflection, and displacement of security ceiling units; and permanent damage to fasteners and anchors.
- B. Acoustical Performance:
  - 1. Single skin plank ceiling system shall provide a NRC of not less than .90 when tested in accordance with ASTM C 423.
  - 2. Acoustical fill flame spread index shall not exceed 15 with smoke developed value not exceeding 5 when tested in accordance with ASTM C 84.
- C. Structural Performance: Security ceiling assemblies shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Live Load for Security Ceiling Assemblies: Panel dead weight plus a uniform load of 500 lbs., acting upward or downward, with a deflection not more than L/360.
- D. Ceiling Assembly Impact Testing
  - 1. Impact testing under this section is performed using the methods and testing equipment described in ASTM F2322.

#### 2.2 DOWNWARD-LOCKING-PANEL SECURITY CEILING ASSEMBLY:

- A. Description: Provide a complete, integrated assembly, tamper-proof acoustical ceiling system including security ceiling panels, exposed suspension system, perimeter supports, and accessories.
- B. Basis-of-Design: Subject to compliance with requirements provide "SecureDek" Metal Pan Ceiling System as manufactured by Trussbilt, LLC. or comparable product by one of the following:
  - 1. Gordon Security Systems "Lock Down".

2. Accurate Perforating "Sentry Panel".
  3. Armstrong "SecureLock".
- C. Non-Perforated Panels (**SMC-1**): Fabricated from a single sheet of metal, with formed upturned edges on all four sides designed to continuously engage with and lock under rectangular bulb of suspension system.
1. Steel Panels: Cold-rolled steel with minimum galvanized sheet- 16 gage thickness.
  2. Panel Size: 24-inches by 24-inches.
  3. Finish: White TGIC polyester powder coat finish.
- E. Perforated Panels (**SMC-2**): Fabricated from a single sheet of metal, with formed upturned edges on all four sides designed to continuously engage with and lock under rectangular bulb of suspension system.
1. Steel Panels: Cold-rolled steel with minimum galvanized sheet- 18 gage thickness.
  2. Panel Size: 24-inches by 24-inches.
  3. Perforation Pattern: 0.125-inch diameter holes, staggered .218-inches on center for a 29% open area.
  4. Finish: White TGIC polyester powder coat finish.
- F. Access Doors: Material, perforation pattern, and finish same as security ceiling panels; designed for installation by security fasteners screwed through suspension system. Provide panels at locations indicated on Drawings or where access is required for equipment or devices above ceiling.
1. Size: 24-inches by 24-inches.
  2. Lock Preparation: Prepare door panel to accept detention lock specified in Section 087163 "Detention Door Hardware".
- G. Suspension System: ASTM C 635/C 635M, heavy-duty exposed system consisting of snap-in main runners supported by hangers attached to building structure.
1. Provide system complete with main runners, splice plates, connector and alignment clips, hangers, trim, seismic- and wind-load clips and struts, and other suspension components required to support security ceiling units and other security ceiling-supported construction.
  2. Main Runners and Cross Tees: Formed from metal sheet, 1-1/2-inches high, with 15/16-inch flange width and with oversized rectangular bulb for engaging panels.
    - a. Material: Galvanized steel, G90 zinc coating.
  3. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
  4. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
  5. Angle Hangers: Angles with legs not less than 7/8-inch wide, formed with 0.04-inch thick, galvanized-steel sheet, G90 zinc coating, with bolted connections and 5/16-inch diameter bolts.
  6. Compression Struts: Fabricated from 3/4-inch-diameter steel tubing, designed to fit over rectangular bulb of suspension system.

- H. Perimeter Supports: Wall-mounted channel moldings and wall angles; fabricated from 0.042-inch thick galvanized steel; finished to match suspension system.
- I. Exposed Edge Moldings and Trim: Provide exposed members as indicated or required for edges of security ceiling, fixture trim, beams, fasciae at changes in security ceiling height, and other conditions; of metal and finish matching security ceiling panels.
- J. Materials:
  - 1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; electrolytic zinc coated suitable for exposed applications.
  - 2. Steel Tubing: ASTM A 513, Type B.
- K. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws or blind rivets. Wall anchor bolts shall be 3/8 in diameter (Rawl 5015 or equivalent) and shall be placed 16 in. on center. Anchors for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.
- L. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class “A” poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1. 5 of this specification.

## 2.3 SECURITY PLANK CEILING ASSEMBLIES:

- A. Basis-of-Design Product: Subject to compliance with requirements provide “BarrierDek” Metal Plank System as manufactured by Trussbilt, LLC. or comparable product by one of the following:
  - 1. Gordon Security Systems “Cel Line”.
  - 2. Accurate Perforating “Sentry Plank”.
  - 3. Kane Manufacturing Corporation “Model: GCLGN”.
  - 4. Armstrong “SecureLock Plus”.
- B. Non-Perforated Single-Configuration Panels (**SMC-3**): Grade 1 and 2 single skin inter-locking steel plank ceiling system.
  - 1. Sheet Thickness: 12 gage.
  - 2. Panel Width: 24-inches.
  - 3. Panel Length: Standard lengths 8 ft., 10 ft. and 12 ft.
  - 4. Finish: White TGIC polyester powder coat finish.
- C. Perforated Single-Configuration Panels (**SMC-4**): Fabricated from a single sheet of metal, with a self-locking male/female lap joint for joining panels.
  - 1. Sheet Thickness: 12 gage.
  - 2. Panel Width: 24-inches.
  - 3. Panel Length: Standard lengths 8 ft., 10 ft. and 12 ft.
  - 4. Perforation Pattern: 0.125-inch diameter holes, staggered .218-inches on center for a 29% open area.
  - 5. Finish: White TGIC polyester powder coat finish.

- D. Access Doors: Material and finish same as security ceiling panels; designed for installation by security fasteners screwed through suspension system. Provide at locations indicated on Drawings or where required to access equipment or devices above the ceiling.
1. Size: 24-inches by 24-inches or indicated.
  2. Lock Preparation: Prepare door panel to accept detention lock specified in Section 087163 "Detention Door Hardware".
- E. Closures: Fabricated from minimum 0.053-inch thick steel sheet, finished to match security ceiling panels. Fasten with security fasteners or by welding.
- F. Suspension System: Heavy-duty exposed system consisting of intermediate carriers supported by secondary support system attached to building structure.
1. Intermediate Carriers: Formed from tees with a nominal 4-inch wide exposed face or built up from back-to-back angles or channels each with a nominal 2-inch wide exposed face; fabricated from gage which is appropriate for panel support.
    - a. Finish: Powder coat; match security ceiling panels.
  2. Secondary Support System:
    - a. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
    - b. Angle Hangers and Compression Struts: 1-1/2-by-1-1/2-inch galvanized-steel angles, G90 zinc coating, bolted to intermediate carriers and building structure.
- G. Perimeter Supports: Wall-mounted angles, tees, and bearing plates; fabricated from minimum 0.068-inch thick, cold-rolled steel sheet; finished to match security ceiling panels.
- H. Exposed Edge Moldings and Trim: Provide exposed members as indicated or required for edges of security ceiling, fixture trim, beams, fasciae at changes in security ceiling height, and other conditions, of metal and finish matching security ceiling panels.
- I. Materials:
1. Cold-Rolled Steel Sheet: Panel face sheets shall be made of commercial quality, level, cold-rolled steel conforming to ASTM A 1008 / A 1008M CS Type B and shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A653M Commercial Steel (CS), coating designation A40.
  2. The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
  3. Steel Tubing: ASTM A 513, Type B.
- J. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws or blind rivets. Wall anchor bolts shall be 3/8 in diameter (Rawl 5015 or equivalent) and shall be placed 16 in. on center. Anchors for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.

- K. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class "A" poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification.

## 2.4 FABRICATION

- A. Panels: Form metal panels from sheet metals selected for their surface flatness, smoothness, and freedom from surface blemishes where exposed to view in finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, or variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet.
- B. Access Doors: Factory install access doors in security planks and attach by welding.
- C. Acoustical Ratings: determined according to ASTM E 1264, unless otherwise indicated.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.7 STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

- 1. Color and Gloss: White

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of security ceiling assemblies.

- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of security ceiling assembly connections before security ceiling assembly installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of security ceiling assemblies.
- D. Inspect built-in and cast-in anchor installations before installing security ceiling assemblies to verify that anchor installations comply with requirements. Prepare inspection reports.
  - 1. Repair, or remove and replace, anchors where inspections indicate noncompliance with specified requirements. Re-inspect after repair or replacement.
  - 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- E. Verify locations and layouts of security ceiling assemblies with those indicated on reflected ceiling plans and coordination drawings.
  - 1. Coordinate location of mechanical and electrical items that will require access above the non-accessible security ceiling system.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other security ceiling anchors whose installation is specified in other Sections.
  - 1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.
- B. Measure each security ceiling area and establish layout of security ceiling panels to balance border widths at opposite edges of each security ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans and Coordination Drawings.

### 3.3 GENERAL INSTALLATION

- A. Comply with CISCA's "Ceiling Systems Handbook" for installation of security ceiling assemblies.
- B. Install perimeter supports around perimeter of security ceiling area.
  - 1. Sealant: Apply polyurethane security sealant in a continuous ribbon concealed on back of vertical legs of supports before they are installed.
  - 2. Attach supports with anchor bolts or expansion anchors spaced not more than 12-inches o.c. and not more than 3-inches from ends. Miter corners accurately.
    - a. Level perimeter supports with suspension system to a tolerance of 1/8-inch in 12 feet.



3. Do not use exposed fasteners, including pop rivets, on moldings and trim. If exposed fasteners are unavoidable, obtain approval from Architect for their use and use security fasteners.
- C. Install accessories where indicated and as required to comply with performance requirements.
  1. Sound-Absorptive Pads: For security ceiling panels indicated, provide sound-absorptive pads of width and length to completely fill inside of each security ceiling panel.
    - a. Install sound-absorptive pads over metal spacer grids with support clips.

### 3.4 DOWNWARD-LOCKING-PANEL SECURITY CEILING ASSEMBLY INSTALLATION

- A. Ceiling Hangers: Suspend from building's structural members and as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within security ceiling plenum that are not part of supporting structure or of security ceiling suspension system.
  2. Splay hangers only where required to avoid obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  4. Secure wire hangers to security ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. Do not support security ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts or post installed mechanical or adhesive anchors.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. Space hangers not more than 48-inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8-inches from ends of each member.
  11. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
  12. Install compression struts extending from main runners to structure above and spaced at 48-inches o.c.

- B. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- C. Panel Installation: Install panels to continuously engage with and lock under rectangular bulb of suspension system. Attach panels to perimeter supports with security fasteners not more than 3-inches from edges of panel. Fasten through exposed face of supports into panel.
  - 1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
  - 2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating security ceiling.
  - 3. Install directionally patterned panels in directions indicated.
  - 4. Scribe and cut security ceiling panels for accurate fit at borders and at interruptions and penetrations by other work through security ceilings. Stiffen edges of cut panels as required to eliminate evidence of buckling or variations in flatness.
- D. Access Doors: Install each access panel where shown or where required for access by others. Security ceiling manufacturer shall be responsible for detailing installation of access doors into the ceiling system.

### 3.5 SECURITY-PLANK SECURITY CEILING ASSEMBLY INSTALLATION

- A. Install security planks with long edges continuously interlocked. Adjust security planks to final position before permanently fastening. Provide minimum 1-1/2-inch end bearing.
  - 1. Attach adjacent security planks to each other with security fasteners spaced not more than 12-inches o.c. and not more than 6-inches from ends.
  - 2. Continuously weld ends of security planks to perimeter supports. Remove exposed projecting burrs, edges, and rough spots resulting from welding operations by grinding smooth.
  - 3. Attach ends of security planks to perimeter supports with security fasteners not more than 3-inches from edges of security plank. Fasten through exposed face of supports into security planks.
  - 4. Provide intermediate carriers for ends of security planks that are not supported by perimeter supports. To attach security planks to intermediate carriers, use same method as that used for attaching security planks to perimeter supports.
    - a. Support intermediate carriers from structure above by secondary support system spaced at 48-inches o.c. and bolted to carriers.
- B. Access Doors: Install each access door where shown or where required for access by others. Security ceiling manufacturer shall be responsible for detailing installation of access doors into the ceiling system.
- C. Provide steel angle reinforcement on each side of openings that exceed 12-inches in any direction.

### 3.6 FIELD QUALITY CONTROL

- A. Remove and replace security ceiling assemblies where inspections indicate that work does not comply with specified requirements.
- B. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- C. Prepare field quality-control certification endorsed by Detention Equipment Contractor that states installed products and their installation comply with requirements in the Contract Documents.
- D. Extent and Testing Frequency: Testing will take place in successive stages in areas described below. Proceed with installation of security ceiling assemblies only after test results for previously installed hangers comply with requirements.
  - 1. Extent of Each Test Area: When installation of security ceiling suspension systems on each floor has reached 20 percent completion but no security panel units have been installed.
  - 2. Within each test area, testing agency will select one of every ten anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two post installed anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
  - 3. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those fasteners and anchors not previously tested until 20 consecutively pass and then will resume initial testing frequency.
- E. Fasteners and anchors will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Additional Testing: Where fasteners and anchors are removed and replaced, additional testing will be performed to determine compliance with specified requirements.

### 3.7 CLEANING

- A. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as that used for shop painting; comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum dry film thickness of 2 mils.

END OF SECTION 095753

## SECTION 096513 - RESILIENT BASE 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. Vinyl base.
  - 2. Vinyl molding accessories.
- B. Resilient base shall be Contractor Furnished Owner Installed (CFOI).

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.
- D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

## 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.
  - 2. Materials shall not be used for corrective work nor punch list work.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

### 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

### 2.2 RESILIENT BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
  - 3. Johnsonite; a Tarkett Company.
  - 4. Mannington.
  - 5. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).
  - 1. Group: I (solid, homogeneous).
  - 2. Style and Location:
    - a. Style: Cove: (Base with toe).
- C. Minimum Thickness: 0.125 inch.

- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors and Patterns: As selected from manufacturer's standard colors.

## 2.3 VINYL MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
  - 3. Johnsonite; a Tarkett Company.
  - 4. Mannington.
- B. Description: Description: Carpet edge for glue-down applications, Reducer strip for resilient floor covering, Joiner for tile and carpet and Transition strips.
- C. Material: Vinyl
- D. Colors and Patterns: As selected from manufacturer's standard colors.

## 2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 096513



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## SECTION 096519 - RESILIENT TILE FLOORING

## 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. Vinyl composition floor tile.
- B. Related Requirements:
  - 1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with resilient tile.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient floor tile.
  - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 2. Show details of special patterns.
- C. Samples: Full-size units of each color, texture, and pattern of floor tile required.
- D. Samples for Verification: Full-size units of each color and pattern of floor tile required.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

#### 1.6 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. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

#### 1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

## 2.2 VINYL COMPOSITION FLOOR TILE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Standard Excelon" multi-colored resilient tile as manufactured by Armstrong World Industries, Inc. or a comparable product by one of the following:
  - 1. Congoleum Corporation.
  - 2. Johnsonite; a Tarkett company.
  - 3. Mannington Mills, Inc.
- B. Tile Standard: ASTM F 1066, Homogenous with color extending throughout thickness.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125-inch.
- E. Size: 12 by 12-inches.
- F. Colors and Patterns: Two colors as selected from manufacturer's standard colors.

## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
  - 1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. VCT Adhesives: Not more than 50 g/L.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
  - 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.

- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - 1. Apply two coat(s).
- E. Cover floor tile until Substantial Completion.

END OF SECTION 096519

## SECTION 096566 - RESILIENT ATHLETIC FLOORING

## 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. Resilient (rubber) Athletic Flooring.
- B. Related Requirements:
  - 1. Section 096513 - "Resilient Base and Accessories" for wall base and accessories installed with resilient athletic flooring.

## 1.3 COORDINATION

- A. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

## 1.4 ACTION SUBMITTALS

- A. Product Data:
  - 1. Manufacturer's product data, indicating adhesives comply with applicable VOC regulations.
- B. Shop Drawings: Show installation details and locations of the following:
  - 1. Seaming Diagram.
  - 2. Locations of floor inserts for athletic equipment installed through flooring.
- C. Samples: For each exposed product and for each type, color, and pattern specified, 6-inch-square in size and of the same thickness indicated for the work.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resilient athletic flooring to include in maintenance manuals.



## 1.6 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. Floor Tile: Furnish no less than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of floor tile installed.
  - 2. Materials shall not be used for corrective work nor punch list work.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. Provide resilient flooring manufactured by a firm with a minimum of 10 years' experience with resilient flooring of type equivalent to those specified.
  - 2. Manufacturer shall be capable of providing technical training and technical field service representation.
- B. Installer Qualifications:
  - 1. Acceptable to manufacturer of resilient flooring or INSTALL (International Standards & Training Alliance) resilient certified for the requirements of the project.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
- B. Store materials to prevent deterioration.
  - 1. Store tiles on flat surfaces.
  - 2. Store rolls upright.
  - 3. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 85 deg F.

## 1.9 FIELD CONDITIONS

- A. Adhesively Applied Products:
  - 1. Maintain temperature and humidity at service levels or the ambient temperature must remain steady (+/- 10 deg F) and be between 60 deg F and 80 deg F for at least 48-hours prior, during and 72-hours after installation. The ambient relative humidity is recommended to be 50% RH +/- 10%; however, dew point must be avoided.
  - 2. Close spaces to traffic during flooring installation.

3. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.
- B. Install flooring after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements provide "Triumph" multi-functional flooring as manufactured by Johnsonite, Inc./Tarkett or comparable product by one of the following:
1. Nora Systems.
  2. Mondo.

### 2.2 MATERIALS

#### A. RESILIENT ATHLETIC FLOORING

1. Complies with requirements for ASTM F 1344 Standard Specification for Rubber Floor Tile Class 1-A and 1-B.
2. Tile manufactured of dual durometer layers composed of 100% synthetic and natural rubber, free of toxic heavy metals, phthalate, chlorine and halogen-free.
3. Tile is two-ply vulcanized construction which incorporates a rubber wear layer and an elastic cushioned performance layer.
4. Spike and Skate resistant.
5. Wear layer thickness: .090-inch.
6. Overall thickness: 3/8-inch.
7. Tile design, texture, and color:
  - a. Square Edge (glue down) Hammered Texture:
    - 1) Speckled Color.
8. Tile size:
  - a. Square Edge (glue down) 24" X 24".
9. Traffic-Surface Texture: Hammered.
10. Back of Tile: Double-sanded smooth.
11. Sound Absorption (ISO 140): Lw 17dB.
12. Pattern and Color: As selected by the Architect from manufacturer's standard colors.

## 2.3 ACCESSORIES

- A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.
- B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of flooring.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
  - 3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. 1000 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.

- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.
  - 1. Do not install flooring until it is the same temperature as space where it is to be installed.
- F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.3 FLOORING INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions.
- B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
- C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, non-staining marking device.

### 3.4 FLOOR TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
- B. Discard broken, cracked, chipped, or deformed tiles.
- C. Tile Matching: Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged if so numbered.
- D. Adhered Floor Tile: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
  - 1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing flooring installation:

1. Remove adhesive and other blemishes from flooring surfaces.
  2. Sweep and vacuum flooring thoroughly.
  3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.
- B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION 096566

## SECTION 096623 - RESINOUS MATRIX TERRAZZO FLOORING

## 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. Thin-set, epoxy-resin terrazzo flooring with divider and accessory strips.

- B. Related Requirements:

- 1. Section 042200 – “Concrete Unit Masonry” for CMU base.
  - 2. Section 079200 - "Joint Sealants" for sealants installed with terrazzo.

## 1.3 DEFINITIONS

- A. Aggregate: Marble chips or other types of aggregate.

## 1.4 PREINSTALLATION MEETINGS

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

- 1. Review methods and procedures related to terrazzo including, but not limited to, the following:
    - a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
    - b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - c. Review special terrazzo designs and patterns.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
  2. Control-joint strips.
  3. Accessory strips.
- C. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work, in size indicated below:
1. Terrazzo: 6-inch-square Samples.
  2. Accessories: 6-inch-long Samples of each exposed strip item required.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
1. Include list of projects indicating name and location of project, name of Owner, name and contact information for General Contractor, and name and contact information for Architect.
  2. Include letter from NTMA with the name of the Project and name of member, stating current member status
- B. Material Certificates: For each type of terrazzo material or product, from manufacturer.
1. Epoxy Resin: For each type of resin required indicating that materials meet specification requirements, by manufacturer.
  2. Aggregate: For each type of aggregate required indicating compatibility with terrazzo mix, signed by aggregate supplier.
- C. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For terrazzo to include in maintenance manuals.

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Engage an installer who is a contractor member of NTMA.
  2. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.

- B. Source Limitations: Obtain primary terrazzo materials from single source from single manufacturer.
- C. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- D. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.
- E. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for terrazzo including accessories.
    - a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring and base condition for each color and pattern in locations directed by Architect.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or 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.

#### 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
- C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.



## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

## 2.2 EPOXY-RESIN TERRAZZO

- A. Epoxy-Resin Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Crossfield Products Corp.
  - b. Doyle Dickerson Terrazzo, Inc.
  - c. Hi-Tek Polymers, Inc.
  - d. Key Resin Company.
  - e. Master Terrazzo Technologies LLC.
  - f. Sherwin-Williams Company, General Polymers.
  - g. Terrazzo & Marble Supply Companies.
- 2. Thickness: 3/8-inch nominal.
- 3. Custom Mix Color and Pattern: Match architect's sample.

- B. Materials:

- 1. Flexible Reinforcing Membrane: Manufacturer's resinous membrane for substrate-crack preparation and reflective-crack reduction.
  - a. Reinforcement: Fiberglass scrim.
- 2. Moisture-Vapor-Emission-Control Membrane: Two-component, high-solids, high-density, low-odor, epoxy-based membrane-forming product produced by epoxy terrazzo manufacturer that reduces moisture emission from concrete substrate to not more than 3 lb of water/1000 sq. ft. in 24 hours.
- 3. Primer: Manufacturer's product recommended for substrate and use indicated.
- 4. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.
  - a. Physical Properties without Aggregates:
    - 1) Hardness: 60 to 85 per ASTM D 2240, Shore D.
    - 2) Minimum Tensile Strength: 3000 psi per ASTM D 638 for a 2-inch specimen made using a "C" die per ASTM D 412.

- 3) Minimum Compressive Strength: 10,000 psi per ASTM D 695, Specimen B cylinder.
- 4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.
  - a) Distilled water.
  - b) Mineral water.
  - c) Isopropanol.
  - d) Ethanol.
  - e) 0.025 percent detergent solution.
  - f) 1.0 percent soap solution.
  - g) 10 percent sodium hydroxide.
  - h) 10 percent hydrochloric acid.
  - i) 30 percent sulfuric acid.
  - j) 5 percent acetic acid.
- b. Physical Properties with Aggregates: For resin blended with Georgia white marble, ground, grouted, and cured per requirements in NTMA's "Terrazzo Specifications and Design Guide"; comply with the following:
  - 1) Flammability: Self-extinguishing, maximum extent of burning 1/4-inch per ASTM D 635.
  - 2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F for temperature range of minus 12 to plus 140 deg F per ASTM D 696.
5. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.
  - a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
  - b. 24-Hour Absorption Rate: Less than 0.75 percent.
  - c. Dust Content: Less than 1.0 percent by weight.
6. Finishing Grout: Resin based.
- C. Epoxy Resin with Aggregate:
  1. Test Specimens:
    - a. Mix epoxy resin according to manufacturer's recommendations and blend one volume of epoxy resin with 3 volumes of marble aggregate, consisting of:
      - 1) 60 percent No. 1 chip.
      - 2) 40 percent No. 0 chip.
    - b. Grind and grout with epoxy resin finished to a nominal 1/4-inch thickness.
    - c. Cure specimens 7 days at 75 deg. F plus / minus 2 deg. and 50 percent plus / minus 2 percent relative humidity.

2. Cured epoxy terrazzo specimens shall nominally meet the following requirements:
  - a. Flammability: Self- extinguishing, extent of burning 1/4 inch maximum according to ASTM D 635.
  - b. Coefficient of Linear Thermal Expansion: 0.000025 inch/inch per deg F for temperature range of minus 12 to plus 140 deg F per ASTM D 696.

## 2.3 STRIP MATERIALS

- A. Thin-Set Divider Strips: L-type angle in depth required for topping thickness indicated.
  1. Bottom-Section Material: Matching top-section material.
  2. Top-Section Material: White-zinc alloy.
  3. Top-Section Width: 1/8-inch.
  4. Strip Thickness: 16 gage.
  5. Type: "L" strip; 3/8-inch by 1/2-inch.
- B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.
- C. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
  1. Edge-bead strips for exposed edges of terrazzo.

## 2.4 MISCELLANEOUS ACCESSORIES

- A. Anchoring Devices:
  1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and required for secure attachment to substrate.
  2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.
- B. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- C. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- D. Resinous Matrix Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- E. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
2. Acid-Base Properties: With pH factor between 7 and 10.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

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

#### 3.2 PREPARATION

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
- B. Concrete Slabs:
  1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.
    - c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
- C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
  1. Moisture Testing: Perform tests indicated below.
    - a. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.
- D. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

### 3.3 EPOXY-RESIN TERRAZZO INSTALLATION

- A. Comply with NTMA's written recommendations for terrazzo and accessory installation.
- B. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."
- C. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.
- D. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
- E. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
- F. Flexible Reinforcing Membrane:
  1. Prepare and prefill substrate cracks with membrane material.
  2. Install membrane at substrate cracks in areas to receive terrazzo.
  3. Reinforce membrane with fiberglass scrim.
  4. Prepare membrane according to manufacturer's written instructions before applying substrate primer.
- G. Primer: Apply to terrazzo substrates according to manufacturer's written instructions.
- H. Strip Materials:
  1. Divider and Control-Joint Strips:
    - a. Locate divider strips in locations indicated.
    - b. Install control-joint strips back to back directly above concrete-slab control joints.
    - c. Install control-joint strips with 1/8-inch gap between strips, and install sealant in gap.
    - d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
  2. Accessory Strips: Install as required to provide a complete installation.
  3. Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch higher than terrazzo surface.

### 3.4 REPAIR

- A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

### 3.5 CLEANING AND PROTECTION

- A. Cleaning:
  - 1. Remove grinding dust from installation and adjacent areas.
  - 2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.
- B. Sealing (at precast terrazzo stair treads):
  - 1. Seal surfaces according to NTMA's written recommendations.
  - 2. Apply sealer according to sealer manufacturer's written instructions.
- C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096623

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## SECTION 096723 - RESINOUS FLOORING

## 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 resinous flooring systems.

## 1.3 PREINSTALLATION MEETINGS

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

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Initial Selection: For each type of exposed finish required.
- C. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.



## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Apply full-thickness mockups on 96-inch- square floor area selected by Architect.
    - a. Include 96-inch length of integral cove base with inside and outside corner.
  - 2. Simulate finished lighting conditions for Architect's review of mockups.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing according to ASTM D 635.

## 2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

## 2.3 RESINOUS FLOORING

- A. Resinous Flooring System Type 1: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Crossfield Products Corp.
    - b. Duraflex, Inc.
    - c. Gold Medal Corporation.
    - d. Key Resin Company.
    - e. Neogard; a division of Jones-Blair, Inc.
    - f. PrimeCoat Coating Systems.
    - g. Stonhard, Inc.
- B. System Characteristics:
  - 1. Color and Pattern: As selected by Architect from manufacturer's full range.
  - 2. Wearing Surface: Manufacturer's standard wearing surface.
  - 3. Overall System Thickness: 35 mils.
- C. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.
- D. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- E. Body Coats:
  - 1. Resin: Urethane.
  - 2. Formulation Description: 100 percent solids.
  - 3. Type: Pigmented.
  - 4. Application Method: Squeegee and backrolled..
  - 5. Number of Coats: One.
  - 6. Thickness of Coats: 25 mils.
  - 7. Aggregates: Manufacturer's standard quartz.
- F. Topcoats: Sealing or finish coats.

1. Resin: Urethane.
  2. Formulation Description: 100 percent solids.
  3. Type: Clear.
  4. Number of Coats: One.
  5. Thickness of Coats: 10 mils.
  6. Finish: Matte.
- G. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
1. Compressive Strength: 8,100 psi minimum according to ASTM C 579.
  2. Tensile Strength: 1,000 psi minimum according to ASTM C 307.
  3. Flexural Modulus of Elasticity: 2,000 minimum according to ASTM C 580.
  4. Water Absorption: 0.64 percent maximum according to ASTM C 413.
  5. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch permanent indentation according to MIL-D-3134J.
  6. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch according to MIL-D-3134J.
  7. Hardness: 80-90, Shore D according to ASTM D 2240.
- H. Resinous Flooring System Type 2:
1. Basis of Design: Sherwin Williams Envirolastic AR425 Polyurea Flexible Coating System or comparable product by one of the following:
    - a. Armorthane.
    - b. PrimeCoat Coating Systems.
  2. Special Considerations:
    - a. 100% solids, spray-applied coating.
    - b. Minimum 30 mil dft.
    - c. Anti-Slip texture.
    - d. Verify manufacturer's recommendations for preparation, moisture content, installation conditions and potential conflicts with concrete mix additives, prior to installation.
    - e. Prior to application of coatings, all surfaces shall be cleaned and prepared in accordance with SSPC-SP13 as required or as specified by the coating manufacturer. Install primer/bond coat as recommended by manufacturer.
    - f. The coating shall be certified to ASTM E84, Class II for surface burning characteristics and shall meet or exceed the following:
      - 1) Adhesion: ASTM D-4541, 350 PSI.
      - 2) Tensile Strength: ASTM D-638, 3000 PSI.
      - 3) Elongation: ASTM D-638, 425%.
      - 4) Hardness: ASTM D-2240, Shore D-51.
      - 5) Tear Strength: ASTM D-624, 450-5.
      - 6) Abrasion Resistance: ASTM 4060, 1000g, 1000 cycles CS-17: 8 mg loss.

- 7) Accelerated Weathering: ASTM G-53, 3,000 Hrs.
- 8) Gardner Impact Resistance: ASTM 2794, 160 in. lbs.
- 9) Salt Fog Resistance: ASTM B117-90, 3,000 Hrs.

g. Seal with Urethane Top Coat.

- 1) Base Product: Sherwin Williams Armorseal HS Polyurethane.
- 2) Color and Pattern: Sherwin Williams 4018 Tower Gray.
- 3) Optional Manufacturers:
  - a) Armorthane.
  - b) PrimeCoat Coating Systems.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  1. Roughen concrete substrates as follows:
    - a. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
  2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
  3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
    - a. Relative Humidity Test: Use in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range.
  5. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

### 3.2 APPLICATION

- A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
  1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness indicated for flooring system.
  1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- D. Squeegee and Backroll Body Coats: Squeegee and backroll body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- E. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

### 3.3 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

## SECTION 096725 - SEAMLESS SHOWER COATINGS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes:
  - 1. Seamless resinous coatings for floors, walls and ceilings of all CMU showers.
    - a. Work includes surface preparation for resinous shower coatings.
    - b. Work excludes coatings on prefabricated stainless-steel shower enclosures.
- B. Related Sections:
  - 1. Section 042200 – "Concrete Unit Masonry" for CMU shower walls.
  - 2. Section 079200 "Joint Sealants" for sealants installed at joints in resinous flooring systems.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include product installation and application guide.
- B. Samples for Verification: For each type of coating indicated in each color and gloss.
  - 1. Submit Samples on same type of substrate as that to receive application, 8-inches square.
  - 2. Apply coats on Samples in steps to show each separate coat, including primers and block fillers as applicable.
  - 3. Label each coat of each Sample.

## 1.4 QUALITY ASSURANCE

- A. References: Cited Standards are incorporated herein by reference and govern the work:
  - 1. Pamphlet No. 03732, International Concrete Repair Institute (Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.

- B. Single Source Responsibility: Obtain primary resinous wall, floor and ceiling materials including hardening agents, finish or sealing coats from a single manufacturer with not less than five (5) years of successful experience in manufacturing and installing the principal materials described in this section. Provide secondary materials only of type and from a source recommended by the manufacturer of the primary material.
- C. Installer Qualifications: An authorized representative who is trained and approved by manufacturer. Provide the following proof of experience.
  - 1. Letter of training from the Approved Material manufacturer stating that contractor has been an approved installer for a minimum of five (5) years and has been successful in the installation of the manufacturers Approved Materials on ten (10) projects of similar complexity and size as this project.
  - 2. List of ten (10) projects using the manufacturers Approved Materials on projects of similar complexity and size as this project including Owner's names, current phone number and list of material used on project.
  - 3. Submit resume of the key person(s) who will be performing the actual work using the manufacturers Approved Materials and list a minimum of five (5) projects with different Owners including Owner's names, current phone number, and data sheets on the material used on project.
- D. Approved Manufacturer Supervision: A representative of the materials manufacturer must be present on site for the duration of the preparation and for all phases of the installation of the specified coating materials.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site with labels legible and intact.
- B. Storage of materials:
  - 1. Store only acceptable project materials on site.
  - 2. Store in suitable location convenient to progress of work.
  - 3. Comply with health and fire regulations.
  - 4. Storage temperature shall be between 60 F and 90 F or such other ambient temperature conditions as may be specifically recommended by product manufacturer.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations:
  - 1. Comply with manufacturer's recommendations as to environmental conditions under which coating systems can be applied. Surfaces to be coated and ambient air temperature shall be between 65 F and 85 F. Do not apply coatings at temperatures beyond those limits stated in the manufacturer's technical data sheet unless given written permission by the manufacturer.

2. Do not apply coatings in areas where dust or other airborne particulate matter is being generated.
- B. Protection: Cover or otherwise protect finished work of other trades and surfaces not being coated concurrently or not to be coated.
- C. Lighting: Provide permanent lighting producing a minimum for 50 foot candles uniform distribution or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous coating application.
- D. Mitigation of Damaging Conditions: Leaks from piping, condensate spills from air conditioning systems and other sources of intrusion upon the coating application area must be corrected prior to the commencement of the coating application.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide by Decofloor Coating Systems; "Decofloor Seamless Shower Coating (DFL-950)" or a comparable product by one of the following:
  1. Prime Coat Coating Systems, "System 5130 Seamless Coatings System for Showers"
  2. Other suppliers must be pre-approved in writing and provide systems as specified herein in accordance with plans and specifications.
- B. System Components: Decofloor Coating Systems products include DFL 850 EMM, DFL 200CGFa, DFL 200CGFb , ECO-45 Cove Base. Overall system minimum thickness is 1/16"
- C. Product Composition:
  1. All Coatings used must be Zero-VOC, 100% solids polyurethane elastomer.
- D. Colors: Colors shall be selected by the Architect from Manufacturer's standard colors.
  1. Walls, floors and ceilings are to be the same color.
- E. Product Characteristics:
  1. Hardness (ASTM-D2240) – 70 Shore D
  2. Tensile Strength (ASTMD-638) – 2500 PSI
  3. Tensile Elongation: 65% (ASTM D 638).
  4. Coefficient of Friction (Dry) (ASTM-F-1679) – 0.77
  5. Coefficient of Friction (Wet) (ASTM-F-1679) – 0.66
  6. Abrasion Resistance: <0.20mg. maximum weight loss (ASTM D 4060, Taber Abrader CS-17 wheel, 1,000 gm load, 1,000 revolutions).



7. Hardness: 88 Shore D (ASTM D 2240).
  8. Bond Strength: >400 psi or substrate failure (ASTM D4541).
- F. Selected coating systems shall be applied in accordance with manufacturer's instructions and these specification documents.
- G. Include on labels of containers:
1. Manufacturer's name.
  2. Product name.
  3. Product number.
  4. Color.
  5. Instructions for reducing, where applicable.
  6. Component description
- H. Application directions: Apply each component of the seamless shower coating system in compliance with manufacturer's written installation instructions and strictly adhere to mixing and installation methods, recoat windows, cure times and environment restrictions. The shower system is to be installed directly over non-moving control joints and cracks with have been treated with manufacturer's Fill and the shower system will terminate at the edge of isolation and expansion joints as designated by the Architect, Engineer or Design Professional. Integral cove base shall be installed where specified in drawings.
- I. Proportioning: Proportioning of two-part coatings shall be in strict accordance with methods recommended by the Manufacturer.

## 2.2 MIXING

- A. Accomplish job mixing and application only when acceptable to the Architect/Engineer.
- B. Mix components only in containers furnished by the Manufacturer.
- C. Proportioning of two-part and three-part coatings shall be in strict accordance with methods recommended by the Manufacturer.
- D. Prime coat shall be mixed using a variable speed drill with a PS Jiffy blade. Parts A and B shall be mixed a minimum of two minutes. Ensure full blending of both parts with all material measured into the mixing container. Apply the mixed material within the pot life, induction times and temperatures recommended by the Manufacturer.
- E. Do not reseal mixed material. Permit final chemical set to occur in the container and when set has been achieved; dispose of hardened material by legal means.
- F. Do not apply any material that has exceeded shelf and pot life as determined by manufacturer.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. Examine surfaces scheduled to receive coating for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work as included in 3.2. Preparation of Surfaces.
- B. Notify Owner's agent immediately upon determination that surfaces scheduled to receive coating are unacceptable for proper adhesion or subsequent performance.
- C. Do not proceed with surface preparation or coating application until conditions are suitable.

### 3.2 PREPARATION OF SURFACES

- A. Concrete Masonry Unit: Prior to installation of high-performance coatings, CMU walls shall receive a visual inspection by the onsite manufacturer's representative to assure that the substrate is acceptable for coating. The Masonry Contractor is to correct deficiencies.
  - 1. Mortar joints are struck clean and filled tightly to avoid gaps or holes and provide a neat, uniform appearance in accordance with procedures as outlined under Division 4 - "Concrete Unit Masonry".
  - 2. Removal of all mortar spatter, protruding mortar edges, and other excessive mortar.
  - 3. All rough edges shall be ground smooth.
  - 4. CMU to be cleaned as specified under requirements as outlined under Division 4 "Concrete Unit Masonry".
  - 5. All surfaces shall be clean, dry and free of contaminants prior to installing coating system.
- B. Concrete Floor Slabs on Grade:
  - 1. Smooth troweled dense finish concrete, which shall have been properly cured not less than twenty-eight (28) days after placement.
  - 2. Employ a radio frequency moisture meter to determine that residual un-combined moisture content of concrete slab is less than five (5) percent by weight. Conduct ASTM F 1869 to further record the Moisture Vapor Emission Rate or ASTM F 2170. Do not apply high performance floor coatings to floor slabs that exceed 5 percent moisture content or 3 pounds per 1,000 square feet per 24 hours unless approved by the material manufacturer.
  - 3. Diamond grind to profile all concrete surfaces scheduled to receive high performance floor coatings to a classification of CSP-2.
  - 4. Remove and legally dispose of all debris and contaminants.

### 3.3 APPLICATION

## A. General Requirements:

1. Do not apply initial coating until moisture content of surface is within limitations recommended by coating manufacturer and never install coatings when the substrate temperature is less than 5 degrees above dew point unless specifically approved, in writing, by the manufacturer.
2. Keep all application equipment free from contaminants and suitable for the finish required.
3. Comply with recommendation of product manufacturer for cure times and re-coat windows. Unless specifically allowed by the manufacturer re-coat windows will not be violated.
4. Finish coats shall be smooth to the touch and free of skipped or missed areas. An orange peel texture with occasional fiberglass lumps is normal and acceptable.
5. Floor texture to be approved by customer through mock up. Texture to be verified by Sullmair FSC200-1346 floor tester.
6. Where walls and floors abut and are both of a resinous material, obtain all coating materials from a single manufacture being sure to meet all re-coat windows to insure a seamless installation.
7. Make edges where adjoining other materials or colors, clean and sharp with no overlapping.
8. Change colors at areas designated by Owner's agent and/or on color schedule where colors differ between adjoining spaces or rooms where door frames match wall colors.

## 3.4 CLEANING

- A. Remove debris promptly from work area and dispose of properly.
- B. Remove spilled, splashed, or splattered coating materials from all surfaces.
- C. Do not mar surface finish of items being cleaned.

## 3.5 FINISH SCHEDULE

- A. Apply Security Seamless Shower Coating to all areas shown on the drawings or specified in the Room Finish Schedule, and as follows:
  1. All showers in inmate areas with CMU walls.
- B. Unless directed by the contract documents do not install high performance coatings on:
  1. Ferrous metals installed in concrete slabs
  2. Non-ferrous metals installed in or adjacent to concrete slabs.
  3. Pipe, conduit, floor drains, insulated conductors, or other electrical, mechanical or process-related equipment.

END OF SECTION 096725

## SECTION 096813 - CARPETING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes modular carpet tile and broadloom carpet.
- B. Related Requirements:
  - 1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include installation recommendations for each type of substrate.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules. Carpet Tile: Full-size Sample.
- C. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

#### 1.6 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. Carpet Tile: Full-size units equal to 10 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  1. Build mockup in one office at location determined by the Architect.
  2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

#### 1.9 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

## 1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
  3. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

2.1 CARPET TILE – **CPT-1** FIELD COLOR 1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Uncharted Collection Solve II 359 Ecoactive, as manufactured by Mohawk Group, or a pre-approved product by one of the following:
1. Atlas.
  2. C & A.
  3. Interface.
  4. J & J.
  5. Shaw.
- B. Product Type: Tile
- C. Construction: Tufted.
- D. Surface Texture: Textured Patterned Loop.
- E. Gauge: 1/12" (47 rows per 10 cm)
- F. Density: 7,111
- G. Weight Density: 113,77
- H. Stitches per Inch: 10.4 (40.94 per cm)
- I. Finished Pile Thickness: 0.081" (2.05 mm)
- J. Dye Method: Solution Dyed / Yarn Dyed
- K. Backing Material: EcoFlex ICT
- L. Fiber Type: Colorstrand Nylon.

M.	Face Weight:	16.0 oz. per square yard.
N.	Size:	24 by 24 inches.
O.	Soil Release Technology:	Sentry Plus
P.	Installation Method:	Quarter turn
Q.	Foot Traffic Recommendation TARR:	Severe
R.	Pre-Consumer Recycled Content:	45%
S.	NSF 140:	Gold
T.	Indoor Air Quality:	Green label Plus 1098
U.	Declare Label:	Declared
V.	Static:	AATCC-134 Under 3.5 KV
W.	Flammability:	ASTM E648 Class 1 (Glue Down)
X.	Smoke Density:	Less than 450 per ASTM E 662.

## 2.2 CARPET TILE – **CPT-2** FIELD COLOR 2

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Uncharted Collection Solve II 359 Ecoactive, as manufactured by Mohawk Group, or a pre-approved product by one of the following:
1. Atlas.
  2. C & A.
  3. Interface.
  4. J & J.
  5. Shaw.
- B. Product Type: Tile
- C. Construction: Tufted.
- D. Surface Texture: Textured Patterned Loop.
- E. Gauge: 1/12" (47 rows per 10 cm)
- F. Density: 7,111
- G. Weight Density: 113,77
- H. Stitches per Inch: 10.4 (40.94 per cm)

I.	Finished Pile Thickness:	0.081" (2.05 mm)
J.	Dye Method:	Solution Dyed / Yarn Dyed
K.	Backing Material:	EcoFlex ICT
L.	Fiber Type:	Colorstrand Nylon.
M.	Face Weight:	16.0 oz. per square yard.
N.	Size:	24 by 24 inches.
O.	Soil Release Technology:	Sentry Plus
P.	Installation Method:	Quarter turn
Q.	Foot Traffic Recommendation TARR:	Severe
R.	Pre-Consumer Recycled Content:	45%
S.	NSF 140:	Gold
T.	Indoor Air Quality:	Green label Plus 1098
U.	Declare Label:	Declared
V.	Static:	AATCC-134 Under 3.5 KV
W.	Flammability:	ASTM E648 Class 1 (Glue Down)
X.	Smoke Density:	Less than 450 per ASTM E 662.
Y.	Location:	Training Room C1034

### 2.3 CARPET TILE – **CPT-3** BORDER

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Broadloom Spectrum V30, as manufactured by Mohawk Group, or a pre-approved product by one of the following:
1. Atlas.
  2. C & A.
  3. Interface.
  4. J & J.
  5. Shaw.
- B. Product Type: Broadloom
- C. Construction: Tufted.



D.	Surface Texture:	Level Solid Cut
E.	Gauge:	1/10" (39.37 rows per 10 cm)
F.	Tufted Weight:	30 oz.
G.	Dye Method:	Pierce Dyed
H.	Backing Material:	Weldlok
I.	Fiber Type:	Colorstrand Nylon.
J.	Soil Release Technology:	Sentry Plus
K.	Width:	12 ft.
L.	Foot Traffic Recommendation TARR:	Severe
M.	Pre-Consumer Recycled Content:	45%
N.	NSF 140:	Gold
O.	Indoor Air Quality:	Green label Plus Certified
P.	Flammability:	ASTM E648 Class 1 (Glue Down)
Q.	Smoke Density:	Less than 450 per ASTM E 662.
R.	Location:	Training Room C1034

#### 2.4 WALK OFF CARPET TILE – **CPT-4**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Mohawk Group, Tuff Stuff II or a pre-approved product by one of the following:
1. Atlas.
  2. C & A.
  3. Interface.
  4. J & J.
  5. Shaw.
- |    |                  |                              |
|----|------------------|------------------------------|
| B. | Product Type:    | Tile-walk off                |
| C. | Construction:    | Tufted.                      |
| D. | Surface Texture: | Performance Level Loop Pile. |
| E. | Gauge:           | 5/32" (25.2 rows per 10 cm)  |

F.	Density:	6739
G.	Weight Density:	256,082
H.	Stitches per Inch:	8.5 (33.46 per 10 cm)
I.	Finished Pile Thickness:	0.203"
J.	Dye Method:	Solution Dyed.
K.	Backing Material:	EcoFlex ICT
L.	Fiber Type:	Dura Color @ Premium Nylon.
M.	Fiber Technology:	Duracolor MD Stain and Bleach Resistant System.
N.	Face Weight:	38.0 oz. per square yard.
O.	Size:	24 by 24 inches.
P.	Soil Release Technology:	Sentry
Q.	Pattern Repeat:	Not Applicable.
R.	Installation Method:	Quarter Turn.
S.	Foot Traffic:	Severe
T.	Pre-Consumer Recycled Content:	44%
U.	Post Consumer Recycled Content:	1%
V.	NSF 140:	Gold
W.	Indoor Air Quality:	Green label Plus 1098
X.	Declare Label:	Declared
Y.	Static:	AATCC-134 Under 3.5KV
Z.	Flammability:	ASTM E648 Class 1 (Glue Down)
AA.	Smoke Density:	Less than 450 per ASTM E 662.
BB.	CRI Green Label Plus Certified:	Y

## 2.5 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
  - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Transition Strips: See Section 096513 "Resilient Base and Accessories".

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

### 3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.
- H. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.

- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

## SECTION 096900 - ACCESS FLOORING

## 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. Access-flooring panels.
  - 2. Understructure.
  - 3. Floor panel coverings.
  - 4. Various electrical data and communication accessories.
- B. Related Requirements:
  - 1. Section 096813 - "Tile Carpeting" for access floor surface material.
  - 2. Division 23 Sections for "Heating, Ventilating and Air Conditioning".
  - Division 26 Sections for "Electrical".

## 1.3 COORDINATION

- A. Coordinate location of mechanical and electrical work in underfloor cavity to prevent interference with access-flooring pedestals.
- B. Mark pedestal locations on subfloor using a grid to enable mechanical and electrical work to proceed without interfering with access-flooring pedestals.

## 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review connection with mechanical and electrical systems.
  - 2. Review requirements related to sealing the plenum.
  - 3. Review procedures for keeping underfloor space clean.

## 1.5 ACTION SUBMITTALS

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

- B. Shop Drawings: Include layout of access-flooring system and relationship to adjoining Work based on field-verified dimensions.
  - 1. Details and sections with descriptive notes indicating materials, finishes, fasteners, typical and special edge conditions, accessories, and understructures.
- C. Samples:
  - 1. Floor Covering: Full-size units for each color and texture specified.
  - 2. Exposed Metal Accessories: Approximately 10 inches in length.
  - 3. One complete full-size floor panel, pedestal, and understructure unit for each type of access-flooring system required.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of access-flooring system.
- C. Product Test Reports: For each type of flooring material and exposed finish, for tests performed by a qualified testing agency.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Flooring Panels: Four (4).
  - 2. Pedestals: Four (4).

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Warranty: Five (5) years from the date of Substantial Completion.

#### 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install access flooring until spaces are enclosed, ambient temperature is between 50 and 90 deg F (10 and 32 deg C), and relative humidity is not less than 20 and not more than 70 percent and remain within these environmental limits throughout installation and occupancy. All bare floor panels shall be stored in this environment at least 24 hours before installation begins.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Access flooring shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Structural Performance: Provide access-flooring systems capable of complying with the following performance requirements according to testing procedures in CISCA's "Recommended Test Procedures for Access Floors":
  - 1. Concentrated Loads: 1500 lbf (6672 N) with the following deflection and permanent set:
    - a. Top-Surface Deflection: 0.08-inch.
    - b. Permanent Set: 0.08-inch.
  - 2. Ultimate Loads: 4000 lbf.
  - 3. Rolling Loads: With local or overall deformation not to exceed 0.040-inch.
    - a. CISCA Wheel 1: 10 passes at 1250 lbf.
  - 4. Stringer Load Test: 450 lbf at center of span with a permanent set not to exceed 0.010-inch.
  - 5. Pedestal Axial Load Test: 5000 lbf.
  - 6. Pedestal Overturning Moment Test: 1000 lbf x inches.
  - 7. Uniform Load Test: 250 lbf/sq. ft. with a maximum top-surface deflection not to exceed 0.040 inch (1.02 mm) and a permanent set not to exceed 0.010-inch.
  - 8. Drop Impact Load Test: 175 lb.
- C. Fire Performance:
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 2. Combustion Characteristics: ASTM E 136.

## 2.2 MANUFACTURERS

- A. Source Limitations: Obtain access-flooring system from single source from single manufacturer.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide "TecCrete 1500" access flooring as manufactured by Haworth, Inc. or a comparable product by one of the following:



1. ASM Modular Systems, Inc.
2. Tate Access Floor.

## 2.3 FLOOR PANELS

- A. Floor Panels, General: Provide modular panels interchangeable with other field panels without disturbing adjacent panels or understructure.
1. Size: Nominal 24 by 24-inches by 1-1/2-inches deep.
  2. Attachment to Understructure: Bolted.
  3. Fabricate panels to accept floor finish specified.
- B. Exposed-Concrete-Surface Panels: Fabricated with bottom pan that is die formed from metallic-coated steel sheet and filled with lightweight, high strength, concrete that is reinforced and bonded to pan by shear ties.
1. Panel:
    - a. Quantity: As shown on Drawings.
    - b. Finish: Factory standard bare concrete for field installed carpet tile.
    - c. Carpet tile: Access floor system shall be designed to accommodate a modular carpet tile. Carpet tile shall be installed such that carpet tile seams are equally staggered with seams of access floor panels. Install per manufacturer's written recommendation.

## 2.4 UNDERSTRUCTURE

- A. Pedestals: Assembly consisting of base, column with provisions for height adjustment, and head (cap); made of steel.
1. Provide pedestals designed for use in seismic applications.
  2. Base: Square or circular base with not less than 16 sq. in. of bearing area.
  3. Column: Of height required to bring finished floor to elevations indicated. Weld to base plate.
  4. Provide vibration-proof leveling mechanism for making and holding fine adjustments in height over a range of not less than 2 inches and for locking at a selected height, so deliberate action is required to change height setting and prevent vibratory displacement.
  5. Head: Designed to support the panel system indicated.
    - a. Provide sound-deadening pads or gaskets at contact points between heads and panels.
- B. Stringer Systems: Modular steel stringer systems designed to bolt to pedestal heads and form a grid pattern. Protect steel components with manufacturer's standard galvanized or corrosion-resistant paint finish.

1. Continuous Gaskets: At contact surfaces between panel and stringers to deaden sound, seal off the underfloor cavity from above, and maintain panel alignment and position.

## 2.5 FLOOR PANEL COVERINGS

- A. Conductive High-Pressure Plastic Laminate: Factory applied, NEMA LD 3, High-Wear type, Grade HDH; fabricated in one piece to cover each panel face with integral trim edging.
  1. Electrical Resistance: Average no less than 25,000 ohms and no more than 1 megohm when installed floor coverings are surface-to-ground tested according to ASTM F 150 with 100-V applied voltage.
  2. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

## 2.6 FABRICATION

- A. Fabrication Tolerances:
  1. Size: Plus or minus 0.020-inch of required size.
  2. Squareness: Plus or minus 0.015-inch between diagonal measurements across top of panel.
  3. Flatness: Plus or minus 0.035-inch, measured on a diagonal on top of panel.
- B. Panel Markings: Clearly and permanently mark floor panels on their underside with panel type and concentrated-load rating.
- C. Cutouts: Fabricate cutouts in floor panels for cable penetrations and service outlets. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with structural performance requirements.
  1. Number, Size, Shape, and Location: As indicated.
  2. Grommets: Where indicated, fit cutouts with manufacturer's standard grommets; or, if size of cutouts exceeds maximum grommet size available, trim edge of cutouts with manufacturer's standard plastic molding with tapered top flange.
  3. Provide foam-rubber pads for sealing annular space formed in cutouts by cables.

## 2.7 ACCESSORIES

- A. Adhesives: Manufacturer's standard adhesive for bonding pedestal bases to subfloor.
- B. Service Outlets: Standard UL-listed and -labeled assemblies, for recessed mounting flush with top of floor panels; for power, communication, and signal services; and complying with the following requirements:
  1. Structural Performance: Cover capable of supporting a 1000-lbf (4448-N) concentrated load.

2. Cover and Box Type: Grommet with twist-close cover and including steel junction box for electrical receptacle with provision for telephone connectors and signal cables.
  3. Location: In center of panel quadrant unless otherwise indicated.
  4. Receptacles and Wiring: Equip each service outlet with power receptacles to comply with the following requirements:
    - a. Type of Receptacle: Heavy-duty duplex, two-pole, three-wire grounding, 20 A, 125 V, NEMA WD 6, Configuration 5-20R unless otherwise indicated.
    - b. Number of Receptacles for Outlet: Two.
    - c. Wiring Method: Power-in connectors, built into outlet housing, of type to fit power-in and power-out connectors of branch-circuit cables supplied with building electrical system.
- C. Plenum-Wall Brush Grommets: Self-sealing cable brush grommet with 3-inch (76-mm) round usable area for passage of power and signal cables through plenum walls. Frame of ABS plastic with passageway consists of intermediate layer of flexible EPDM rubber and interwoven nylon filaments
- D. Closures: Where underfloor cavity is not enclosed by abutting walls or other construction, provide metal-closure plates with manufacturer's standard finish.
- F. Steps: Provide steps of size and arrangement indicated with floor coverings to match access flooring. Apply nonslip aluminum nosings to treads unless otherwise indicated.
- G. Railings: Standard extruded-aluminum railings at ramps and open-sided perimeter of access flooring where indicated. Include handrail, intermediate rails, posts, brackets, end caps, wall returns, wall and floor flanges, plates, and anchorages where required.
1. Provide railings that comply with structural performance requirements specified in Section 055213 "Pipe and Tube Railings"
- H. Panel Lifting Device: Panel manufacturer's standard portable lifting device for each type of panel required.
- I. Perimeter Support: Where indicated, provide manufacturer's standard method for supporting panel edge and forming transition between access flooring and adjoining floor coverings at same level as access flooring.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer and manufacturer's representative present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, foreign deposits, and debris that might interfere with attachment of pedestals.
  2. Verify that concrete floor sealer and finish have been applied and cured.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Lay out floor panel installation to keep the number of cut panels at floor perimeter to a minimum. Avoid using panels cut to less than 6-inches.
- B. Locate each pedestal, complete any necessary subfloor preparation, and vacuum subfloor to remove dust, dirt, and construction debris before beginning installation.

### 3.3 INSTALLATION

- A. Install access-flooring system and accessories under supervision of access-flooring manufacturer's authorized representative to produce a rigid, firm installation that complies with performance requirements and is free of instability, rocking, rattles, and squeaks.
- B. Adhesive Attachment of Pedestals: Set pedestals in adhesive, according to access-flooring manufacturer's written instructions, to provide full bearing of pedestal base on subfloor.
- C. Adjust pedestals to permit top of installed panels to be set flat, level, and to proper height.
- D. Stringer Systems: Secure stringers to pedestal heads according to access-flooring manufacturer's written instructions.
- E. Install flooring panels securely in place, properly seated with panel edges flush. Do not force panels into place.
- F. Scribe perimeter panels to provide a close fit with adjoining construction with no voids greater than 1/8-inch where panels abut vertical surfaces.
1. To prevent dusting, seal cut edges of steel-encapsulated, wood-core panels with sealer recommended in writing by panel manufacturer.
- G. Cut and trim access flooring and perform other dirt-or-debris-producing activities at a remote location or as required to prevent contamination of subfloor under already-installed access flooring.
- H. Grounded Flooring Access Panel Systems: Ground flooring system as recommended by manufacturer and as needed to comply with performance requirements for electrical resistance of floor coverings.
1. Panel-to-Understructure Resistance: Not more than 10 ohms as measured without floor coverings.

- I. Underfloor Dividers: Scribe and install underfloor-cavity dividers to closely fit against subfloor surfaces, and seal with mastic.
- J. Closures: Scribe closures to closely fit against subfloor and adjacent finished-floor surfaces. Set in mastic and seal to maintain plenum effect within underfloor cavity.
- K. Clean dust, dirt, and construction debris caused by floor installation, and vacuum subfloor area as installation of floor panels proceeds.
- L. Install access flooring without change in elevation between adjacent panels and within the following tolerances:
  - 1. Plus or minus 1/8-inch in any 10-foot distance.

#### 3.4 PROTECTION

- A. Prohibit traffic on access flooring for 24 hours and removal of floor panels for 72 hours after installation to allow pedestal adhesive to set.
- B. After completing installation, vacuum access flooring and cover with continuous sheets of reinforced paper or plastic. Maintain protective covering until time of Substantial Completion.
- C. Replace access-flooring panels that are stained, scratched, or otherwise damaged or that do not comply with specified requirements.

END OF SECTION 096900

## SECTION 097200 - WALLCOVERINGS

## 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. Dry erase, magnetic wallcovering for writing and projecting.
  - 2. Decorative trim, tray and accessories for wallcovering.
- B. Related Requirements:
  - 1. Section 092900 - "Gypsum Board" for wallcovering substrate.
  - 2. Section 096513 - "Resilient Base and Accessories" for base at wallcovering.

## 1.3 PREINSTALLATION MEETINGS

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

## 1.4 ACTION SUBMITTALS

- A. Product Data:
  - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
  - 2. Include installation instructions for dry erase wallcovering, adhesive and accessories required.
- B. Shop Drawings: Show location and extent of each wallcovering type. Indicate seams and termination points.
- C. Sample: 7-inches by 9-inches samples of dry erase material required.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each wallcovering, for tests performed by a qualified testing agency.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wallcovering to include in maintenance manuals.

## 1.7 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. Wallcovering Material: Full width by length to equal to 5 percent of amount installed.

## 1.8 QUALITY ASSURANCE

- A. Installer: Installation by skilled commercial wallcovering contractor with not less than three (3) years of documented experience installing dry erase wallcovering of the types and extent required.
- B. WARRANTY
  - 1. Five (5) years from date of Substantial Completion.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wallcoverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Maintain constant recommended temperature and humidity for at least 72 hours prior to and throughout installation period and for 72 hours after wallcovering installation.
- C. Lighting: Do not install wallcovering until lighting, not less than 80-footcandles, that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wallcovering.
- D. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wallcovering manufacturer for full drying or curing.

## PART 2 – PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Provide material that meet Class I/A rating when tested in accordance with ASTM E 84 for flame spread and smoke developed. Testing by a qualified testing agency.

## 2.2 PRESENTATION DRY ERASE WALLCOVERING

- A. Basis-of-Design Product: Subject to compliance with requirements provide "Walltalkers M2PR Projectable Magrite" laminate wallcovering manufactured by Koroseal Interior Products, LLC. or a comparable product by the following:
  - 1. VersaPRO Egan Versa Presentation Surfaces.
- B. Description: Provide scrim backed, ferrous powder vinyl bonded with white pigmented vinyl capped with matt gloss, dry erase film and complying with the following:
  - 1. Laminate Thickness: 24 mils (average).
  - 2. Tensile: 80 x 80 lbs.
- C. Width: 49/50-inches.
- D. Backing: Scrim fabric.
  - 1. Fiber Content: Woven Polyester.
- E. Color: White.
- F. Finish: Matte.

## 2.3 ACCESSORIES

- A. Adhesive: Heavy-duty clear or clay based premixed vinyl adhesive.
- B. Substrate Primer/Sealer: White pigmented acrylic base primer/sealer specifically formulated for use with vinyl wallcoverings.
- C. Presentation Starter Kit: Provide five (5) of the manufacturer's starter kit containing eight dry erase markers, one eraser, two dry erase cleaning cloths, one empty bottle of water and one 8 oz. bottle liquid surface cleaning solution.
- D. Magnetic Aluminum Shelf Caddy: For storing markers and erasers.
- E. Magnets: Provide 48 magnets.
- F. Wood Tray: 24-inch by 2-3/4-inch solid red oak wood tray.
- G. Wood Trim: Vintage style hardwood trim.
  - 1. Size: 3/4-inches by 1-3/8-inches.



## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work. Gypsum board substrate level of finish should meet or exceed a Level 4 finish per GA-214-M-97.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wallcovering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
- D. Test gypsum board substrate with suitable moisture meter and verify that moisture content does not exceed four percent.
- H. Check painted surfaces for pigment bleeding. Sand gloss, semi-gloss, and eggshell finish with fine sandpaper.
- I. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- J. Acclimatize wallcovering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

### 3.3 WALLCOVERING INSTALLATION

- A. Comply with wallcovering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Primer: Use a quality pigmented acrylic wallcovering primer.
- C. Adhesive: Apply a uniform coat of heavy-duty pre-mixed clay-based or extra strength clear wallcovering adhesive.
- D. Install each strip horizontally and in the same sequence as cut from the roll.
- E. Install dry erase wallcovering sheets in exact order as they are cut from bolt. Reverse hang alternate strips. Do not crease or bend the wallcovering when handling.

- F. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- G. Fully bond wallcovering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

#### 3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wallcovering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

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## SECTION 097863 - SAFETY PADDING

## PART 1 - 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. Safety padding for walls, floors, doors, and frames at padded cells as indicated on drawings and specified herein.
  - 2. Top coat without safety padding for ceiling at padded cell to match urethane coating on safety padding.
- B. Related Sections:
  - 1. Section 233713 "Diffusers, Registers and Grilles" for grille replacements.
  - 2. Section 265100 "Interior Lighting" for light fixture replacement.

## 1.3 SUBMITTALS

- A. Product Data: For each type of safety padding, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For safety padding. Include mounting details; details at panel head, base, joints, and corners; and details at ceiling, floor, and wall intersections. Indicate panel edge and core materials.
  - 1. Include elevations showing materials, elevations, dimensions, sections, thickness of materials, coverage rates, method of anchoring vertical panels, and other pertinent information.
  - 2. Shop drawings shall show sizes of all vertical panels. Each vertical panel shall be numbered in the shop according to its size and shape, which shall correspond to the same number listed for each vertical panel as shown on the installation shop drawings.
- C. Samples for Verification: Submit three (3) samples, minimum 3" x 3" in size, for approval and acceptance of protection padding system for use in safety cells or holding rooms.
- D. Maintenance Data: For safety padding floor and wall panels to include in maintenance manuals.

1. Submit two (2) copies of resin manufacturer's written maintenance instructions. Instructions shall contain manufacturer's recommend cleaning materials and detailed procedures for minor repairs.
- E. Upon completion of the work, Contractor for work under this section shall certify in writing that all materials used comply with this specification.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
  1. Manufacturers of safety padding systems shall have not less than ten (10) years experience in design and fabrication of safety padding systems.
  2. Manufacturers shall have evidence upon request of five (5) other installations which are commensurate in size and similar in construction.
- B. Fire-Test-Response Characteristics: Provide safety padding meeting the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  1. Surface-Burning Characteristics: As determined by testing per ASTM E 84.
    - a. Flame-Spread Index: 20 or less.
    - b. Smoke-Developed Index: 450 or less.
  2. Material shall be self-extinguishing.

#### 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install safety padding until spaces are enclosed and weather tight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  1. A minimum temperature of 50°F shall be maintained for the duration of the installation.
- B. Field Measurements: Verify locations of safety padding and actual dimensions of openings and penetrations by field measurements before fabrication to ensure proper fit.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which Manufacturer and Installer agree to repair or replace components of safety padding that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:

- a. Fabric sagging, distorting, or releasing from panel edge.
  - b. Warping of core.
  - c. Loss of adhesion or resiliency.
  - d. Delamination.
  - e. Structural failure.
  - f. Deterioration of vertical joints.
  - g. Peeling or cracking of wearing coats (not caused by harsh cleansers)
2. Warranty does not cover damage caused by sharp or burning objects.
3. Warranty Period: Two (2) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by only the following:
  1. Marathon Engineering Corporation, 5615 2<sup>nd</sup> Street West, Lehigh Acres, FL 33971, 239-303-7378, W: [www.goldmedalsafetypadding.com](http://www.goldmedalsafetypadding.com)

### 2.2 SAFETY PADDING MATERIALS

- A. Safety padding materials as hereinafter specified shall be a synthetic resinous material.
  1. Substitutions of a closed-cell polyvinyl chloride or other types of synthetic surfacing materials will not be permitted.
- B. Isocyanate resin material used in surfacing, fill at vertical joints and holes for fasteners, and for wearing coats shall meet the following minimum physical properties when cured.
  1. Weight: Approximately 5 lbs. per square foot.
  2. Hardness Range: 45 – 50 Shore A-2 (ASTM D2240).
  3. Tensile Strength Range: 300 psi minimum (ASTM D412).
  4. Temperature Stability: Essentially unaffected from 20 degrees F to 120 degrees F.
  5. Moisture Absorption: 0.8% to 1.05 % by weight.
  6. Compression Set: 90% recovery after 72 hours.
  7. Compression Properties: 30 psi to 70 psi at 50% modulus.
  8. Elongation at break: 150% typical (ASTM D412).
  9. Fungus Resistance: Complete.
- C. All material must be able to be repaired in the field by the facility's maintenance staff in order to maximize cost effectiveness during the product's life cycle. The product manufacturer must sell repair kits to aid the facility with any repairs

- D. Vertical Wall Panels: All vertical wall panels shall be prefabricated. Overall wall panel thickness is 1-1/2-inches thick consisting of 1-inch nominal safety padding bonded to 7/16-inch thick oriented strand board.
- E. Door Jamb: Door jamb shall be 1/2-inch thick safety padding with a durometer of 60 plus or minus 5, for a total of 1" thickness on door jamb.
- F. Floor Panels: Floor panels shall be prefabricated. Overall floor panel thickness is 1 1/4-inches thick consisting of 3/4-inch nominal safety padding bonded to 7/16-inch thick oriented strand board.
- G. Vertical joints between panels shall be sealed to produce an overall monolithic surface.
- H. Color of urethane surfacing and wearing coats shall be as selected by the architect from the manufacturer's standard colors.

## 2.3 MISCELLANEOUS MATERIALS

- A. Primer for concrete floors, plywood backing, and metal doors shall be of type as recommended by the safety padding manufacturer.
- B. Concealed Fasteners.
  - 1. Fasteners for use in securing vertical panels shall be as recommended by manufacturer. Expansion shield type anchors shall be used where attachment is made directly to masonry walls.
- C. Half Saddle Threshold: BHMA A156.21; extruded aluminum fabricated to full width of opening indicated. Secure with security fasteners.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Pemko Manufacturing Co. 252A Half Saddle Threshold or comparable product by one of the following:
    - a. Hager Companies.
    - b. National Guard Products.
    - c. Reese Enterprises, Inc.
    - d. Zero International.
- D. Exposed Security Fasteners: Provide drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:
  - 1. Drive-System Type: Pinned Torx-Plus.
  - 2. Fastener Strength: 120,000 psi (827 MPa).
  - 3. Head Style: Pinned Torx socket head cap, button, flat, oval, countersunk or low head; as required by installation/application or as otherwise specified.
  - 4. Fastener Base Material: Austenitic stainless steel, ASTM F 879 (ASTM F 879M), Group 1 CW, unless required otherwise for particular strength or finish.

5. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Holo-Krome; a Danaher corporation.
  - b. Safety Socket LLC.
  - c. Tamper-Pruf Screws.
  - d. Textron Fastening Systems; Textron Inc.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine surfaces and conditions to receive work under this section for compliance with requirements, installation tolerances, and other conditions affecting performance of safety padding system. Notify the Architect in writing if surfaces are not satisfactory for application of materials.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work constitutes acceptance of surfaces.

#### 3.2 PREPARATION

- A. Surfaces to receive safety padding shall be free from oil, dirt, dust, paint, and other foreign materials. Sweep, vacuum and damp mop when necessary to remove dust.
  1. Floor: Fill small cracks which would interfere with a satisfactory installation. Moisture test concrete floors before beginning installation to determine the dryness of concrete.

#### 3.3 VERTICAL PANEL INSTALLATION

- A. All vertical panels shall be prefabricated in the shop as hereinafter specified and mechanically fastened to walls. (Adhesive application of panels will not be allowed). NOTE: All vertical panels shall be installed prior to applying resin surfacing to floors.
- B. Panels at windows shall be fabricated as detailed on the drawings. After panels are installed, provide an over pour of resin as hereinafter specified on upper portion of horizontal window mullion.
- C. Panels shall be mechanically fastened to masonry walls. Fasteners shall be spaced not to exceed 12-inches on center vertically and horizontally on masonry walls. (Space fasteners not more than 1 inch from panel edges). Panels shall be installed with 1/8 inch +/- 1/4-inch space between adjacent panels. All fasteners shall be concealed. At all fastener locations, holes shall be drilled through resin surfacing to plywood backing; holes to be slightly larger than fastener head.



- D. At completion of panel installation, all vertical joints between panels and holes through face of panels for fasteners shall be filled with two-part epoxy material. All voids occurring at panel tops shall receive a continuous bead of resin fill. After resin fill has completely cured, sandpaper filled areas flush and smooth with resin panels.

### 3.4 FLOOR AND DOOR INSTALLATION

- A. After concrete and metal surfaces have thoroughly cleaned, apply one (1) coat of primer as recommended by the manufacturer.
- B. An over pour of resin shall be placed over the primed surfaces to a minimum thickness of 1/2-inch. Over pour of urethane shall be installed to meet and joint all vertical surfaces to produce a monolithic surface, free of voids or cracks.

### 3.5 CEILING INSTALLATION

- A. Prepare ceiling surface without safety padding to receive final textured coating to match adjacent walls.

### 3.6 FINAL SURFACING

- A. After all materials have been placed on vertical and floor areas and sanded properly, one coat of textured coating should be applied to walls, doors, floor and ceiling.

### 3.7 PROTECTION

- A. Protect safety padding finishes.
- B. Replace damaged safety padding as directed by the Architect.

### 3.8 CLEANING

- A. Clean safety padding on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 097863

## SECTION 098410 – FIXED SOUND ABSORBING PANELS

## 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. Furnish labor, materials, tools, equipment, and services for Fixed Sound Absorbing Panels, as indicated, in accordance with provisions of Contract Documents.
- B. Related Requirements:
  - 1. Section 092900 - "Gypsum Board" for wall panel substrate.
  - 2. Section 096513 - "Resilient Base and Accessories" for base at wall panels.

## 1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Experience on projects of similar size and complexity.
- B. ASTM International (ASTM):
  - 1. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - 2. ASTM C634 Standard Terminology Relating to Building and Environmental Acoustics.
  - 3. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 4. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - 5. ASTM E366 Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings.
  - 6. ASTM E413 Classification for Rating Sound Insulation.
  - 7. ASTM E580 Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
  - 8. ASTM E966 Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Façade Elements.
  - 9. ASTM E1264 Standard Classification for Acoustical Ceiling Products.
- C. American National Standards Institute (ANSI):

1. ANSI S1.1 American National Standard Acoustical Terminology.
2. ANSI S1.4 American National Standard Specification for Sound Level Meters.
3. ANSI S1.43 American National Standard Specifications for Integrating-Averaging Sound Level Meters.

D. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):

1. Handbook: Sound and Vibration Control.

#### 1.4 SUBMITTALS

A. Shop Drawings:

1. Elevations and Plans as required to show panel joints and locations of furring.
2. Attachment details.

B. Product Data:

1. Manufacturer's literature indicating material in compliance with specifications.

C. Samples:

1. Two, 6-inch x 6-inch pieces of each panel type specified showing full range of exposed texture.

D. Contract Closeout Information:

1. Certificates.
2. Maintenance data:
  1. See Section 017823.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Fixed Sound Absorbing Panels.

1. Basis of Design Product: Subject to compliance provide "Tectum Direct-Attach" acoustical wall panel as manufactured by Armstrong Ceilings or comparable product by one of the following manufacturers:
  1. Homasote Products.

## 2.2 DESIGN CRITERIA

### A. Surface Burning Characteristics:

1. Class I/Class A.
2. Flame Spread: less than 25.
3. Smoke Developed: less than 450.

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### B. Acoustical panel assembly, designed, manufactured, fabricated and installed to provide a minimum of 0.60 Noise Reduction Coefficient (NRC) rating.

## 2.3 MATERIALS

### A. Acoustical Panels - Beveled Edge:

1. Aspen wood fibers bonded with inorganic hydraulic cement.
2. Product Number: 8180.
3. Thickness: 2-inches.
4. Size: 48-inches by 96-inches.
5. Long edge: Beveled.
6. Short edge: Square.
7. Color: Factory painted, White.
8. Mounting style: Direct-attachment to CMU and precast concrete panel.
9. FSC certified.

### B. Construction Adhesive:

1. As recommended by panel system manufacturer.

### C. Molding:

1. Plastic.
2. Configuration as indicated or as appropriate for conditions.

### D. Touch-Up Paint:

1. Color as specified for Acoustical Panels.

### E. Miscellaneous Accessories:

1. Provide fasteners, furring strips, moldings, trim and other items as necessary for a complete single source installation.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities and dampness that would affect quality and execution of work.
- B. Do not proceed with installation of wall panel system until unacceptable conditions are corrected.

### 3.2 INSTALLATION

- A. Comply with the instructions and recommendations of the acoustical wall panel system manufacturer.
- B. Furring Strips:
  - 1. Secure to substrate wall using construction adhesive and fastener type and sizes as appropriate for conditions.
  - 2. Install horizontally on wall surfaces.
  - 3. Maximum Spacing: Not more 24-inches apart.
- C. Secure Panels using construction adhesive and screws.
  - 1. Screw heads to be flush with panel surface.
- D. Securely affix wall panels by means of splines attached vertically to smooth wall or furring strips.
  - 1. Engage vertical kerfs on the edges of the wall panels with splines.
  - 2. Apply adhesive or use Velcro hook and loop fastening where necessary.
- E. Cover field cut edges by means of trim or other moldings.

### 3.3 CLEANING, PROTECTION AND REPAIRS

- A. Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control.
- B. Clean exposed surfaces of acoustical panel, trim, moldings and suspension members.
- C. Touch up any minor finish damage.
- D. Remove and replace work which cannot be successfully cleaned or repaired.

END OF SECTION 098410

## SECTION 099113 - EXTERIOR PAINTING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on exterior substrates.
  - 1. Concrete masonry units (CMU).
  - 2. Precast concrete panels.
  - 3. Galvanized metal.
- B. Related Requirements:
  - 1. Section 081113 – “Hollow Metal Doors and Frames” for painting of doors and frames.
  - 2. Section 099123 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

## 1.3 DEFINITIONS

- A. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Comply with the Buy American Act (41 U.S.C. 10).
- B. Warranty: Fifteen (15) years from the date of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Benjamin Moore & Co.
  2. ICI Paints.

3. Kelly-Moore Paints.
4. M.A.B. Paints.
5. PPG Porter Architectural Finishes, Inc.
6. Sherwin-Williams Company (The).

## 2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
  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 paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: As selected by Architect from manufacturer's full range.

## 2.3 METAL PRIMERS

- A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.

## 2.4 SOLVENT-BASED PAINTS

- A. Alkyd, Exterior, Semi-Gloss (Gloss Level 5): MPI #94.

## 2.5 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  2. Testing agency will perform tests for compliance with product requirements.
  3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.



## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Masonry (Clay and CMU), or Portland Cement Plaster: 12 percent.
  - 2. Precast Concrete: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

## 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Paint entire exposed surface of window frames and sashes.
  - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed to view: Equipment, including panelboards, metal piping, plastic piping, pipe hangers and supports, metal conduit, plastic conduit and tanks that do not have factory-applied final finishes.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. 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.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 EXTERIOR PAINTING SCHEDULE

#### A. CMU and Precast Concrete Substrates:

##### 1. Latex over Alkali-Resistant Primer System:

- a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior, low sheen (Gloss Level 4), MPI #15.

#### B. Galvanized-Metal Substrates:

##### 1. Exterior Alkyd Enamel Over Acrylic Primer System:

- a. Prime Coat: Primer, galvanized metal, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat MPI #107 indicated.
- b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
- c. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #147

- 1) S-W Pro Industrial Acrylic Semi-Gloss, B66W00651.

END OF SECTION 099113

## SECTION 099123 - INTERIOR PAINTING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.
  - 1. Precast Concrete.
  - 2. Concrete masonry units (CMU).
  - 3. Steel.
  - 4. Gypsum board.
  - 5. Applied sprayed-on fireproofing.
- B. Related Requirements:
  - 1. Section 051200 - "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.
  - 2. Section 051213 - "Architecturally Exposed Structural Steel Framing" for painting of these elements.
  - 3. Section 05500 - "Metal Floor Plate Stairs" for painting of these stair assemblies.
  - 4. Section 055213 - "Pipe and Tube Railing" for painting of the handrails and guardrails.
  - 5. Section 081113 - "Hollow Metal Doors and Frames" for painting of doors and frames.
  - 6. Section 099113 - "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

## 1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8-inches square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
  - 3. VOC content.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials 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. (3.8 L) of each material and color applied.

#### 1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- B. Limited Warranty: Fifteen (15) years after date of Substantial Completion.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

#### 1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore & Co.
  2. ICI Paints.
  3. Kelly-Moore Paints.
  4. M.A.B. Paints.
  5. PPG Porter Architectural Finishes, Inc.
  6. Sherwin-Williams Company (The).

#### 2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:

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 paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
1. Flat Paints and Coatings: 50 g/L.
  2. Nonflat Paints and Coatings: 150 g/L.
  3. Dry-Fog Coatings: 400 g/L.
  4. Primers, Sealers, and Undercoaters: 200 g/L.
  5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
  7. Pretreatment Wash Primers: 420 g/L.
  8. Floor Coatings: 100 g/L.
  9. Shellacs, Clear: 730 g/L.
  10. Shellacs, Pigmented: 550 g/L.
- D. Colors: As selected by Architect from manufacturer's full range. Up to six (6) colors.

## 2.3 BLOCK FILLERS

- A. Block Filler, Latex, Interior/Exterior: MPI #4.

## 2.4 PRIMERS/SEALERS

- A. Primer, Alkali Resistant, Water Based: MPI #3.
- B. Primer Sealer, Latex, Interior: MPI #50.

## 2.5 METAL PRIMERS

- A. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.

## 2.6 WATER-BASED PAINTS

- A. Latex, Interior, Flat, (Gloss Level 1): MPI #53.
- B. Latex, Interior, (Gloss Level 3): MPI #52.
- C. Latex, Interior, High Performance Architectural, (Gloss Level 3): MPI #139.

## 2.7 SOLVENT-BASED PAINTS

- A. Alkyd, Interior, Gloss (Gloss Level 6): MPI #48.

## 2.8 DRY FOG/FALL COATINGS

- A. Dry Fall, Alkyd, Flat: MPI #55.

## 2.9 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMU): 12 percent.
  - 3. Gypsum Board: 12 percent.
  - 4. Precast Concrete: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.



- F. Proceed with coating application only after unsatisfactory conditions have been corrected.

- 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed. These items are not considered exposed when they are inside equipment rooms:
    - a. Equipment, including panelboards and switch gear.
    - b. Metal piping.
    - c. Plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  2. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Metal piping.
    - c. Plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.
  3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. 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.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 INTERIOR PAINTING SCHEDULE (Based on Sherwin-Williams products)

- A. Concrete Substrates, Nontraffic Surfaces:
  - 1. High-Performance Architectural Latex System:
    - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
    - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
    - c. Topcoat: Latex, interior, high performance architectural, (Gloss Level 3), MPI #139.
- B. CMU Substrates:
  - 1. High-Performance Architectural Latex System:
    - a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
    - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
    - c. Topcoat: Latex, interior, high performance architectural, (Gloss Level 3), MPI #139.

## C. Steel Substrates:

## 1. Alkyd System:

- a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
- b. Intermediate Coat: Alkyd, interior, matching topcoat.
- c. Topcoat: Alkyd, interior, gloss (Gloss Level 6), MPI #48.

## 2. Alkyd Dry-Fall System: (For Exposed Overhead Steel Structure)

- a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
- b. Topcoat: Dry fall, alkyd, flat, MPI #55.

## D. Gypsum Board Substrates:

## 1. High-Performance Architectural Latex System:

- a. Prime Coat: Primer sealer, latex, interior, MPI #50.
- b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural, (Gloss Level 3), MPI #139.

## E. Applied Sprayed-On Fireproofing Substrates: Training Room C1034

- a. Pro Industrial Waterborne Acrylic Dry-Fall System: (For Exposed steel structure, fireproofing, ductwork, metal piping, plastic piping, metal conduit, plastic conduit, equipment, pipe hangers and supports).
- b. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
- c. Topcoat: Dry fall, waterborne, flat Black B42B00081.

END OF SECTION 099123

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## SECTION 101100 - VISUAL DISPLAY SURFACES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Markerboards.
  - 2. Tackboards.

## 1.3 DEFINITIONS

- A. Tackboard: Framed, tackable, visual display board assembly.
- B. Visual Display Board Assembly: Visual display surface that is factory fabricated into composite panel form, either with or without a perimeter frame; includes markerboards, and tackboards.
- C. Visual Display Surface: Surfaces that are used to convey information visually, including surfaces of marker boards and tack boards, that are not fabricated into composite panel form but are applied directly to walls.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locations of panel joints.
  - 2. Include sections of typical trim members.
- C. Samples for Initial Selection: For each type of visual display surface indicated, for units with factory-applied color finishes, and as follows:
  - 1. Fabric swatches of vinyl fabric faced tack assemblies.
  - 2. Include accessory samples to verify color selected.
- D. Product Schedule: For visual display surfaces, use same designations indicated on Drawings.

- E. Qualification Data: For qualified Installer.
- F. Maintenance Data: For visual display surfaces to include in maintenance manuals.
- G. Warranties: Sample of special warranties.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of motor-operated, sliding visual display units required for this Project.
- B. Source Limitations: Obtain visual display surfaces from single source from single manufacturer.
- C. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 50 or less.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-built visual display surfaces, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, pre-fit components at the factory, disassemble for delivery, and make final joints at the site.
- B. Store visual display surfaces vertically with packing materials between each unit.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install visual display surfaces until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with visual display surfaces by field measurements before fabrication.
  - 1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

## 1.8 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Surfaces lose original writing and erasing qualities.
    - b. Surfaces exhibit crazing, cracking, or flaking.
  - 2. Warranty Period: Life of the building.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: ASTM A 424, enameling-grade steel, uncoated thickness indicated; with exposed face and edges coated with primer, 1.7 to 2.5 mil thick ground coat, and color cover coat; and with concealed face coated with primer and 1.7 to 2.5 mil thick ground coat.
  - 1. Matte-Finish Cover Coat: Low reflective; chalk wipes clean with dry cloth or standard eraser. Minimum 2.0 to 2.5 mil thick cover coat. Cover and ground coats shall be fused to steel at manufacturer's standard firing temperatures but not less than 1250 deg F.
- B. Natural Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish.
- C. Vinyl Fabric: Mildew resistant, washable, complying with FS CCC-W-408D, Type II, burlap weave; weighing not less than 13 oz./sq. yd.; with surface-burning characteristics indicated.
- D. Hardboard: ANSI A135.4, tempered.
- E. Particleboard: ANSI A208.1, Grade M-1.
- F. Fiberboard: ASTM C 208.
- G. Extruded Aluminum: ASTM B 221, Alloy 6063.

### 2.2 MARKERBOARD ASSEMBLIES

- A. Porcelain-Enamel Marker boards: Balanced, high-pressure, factory-laminated marker board assembly of three-ply construction consisting of backing sheet, core material, and 0.021-inch thick, porcelain-enamel face sheet with low gloss finish.



1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. AARCO Products, Inc.
  - b. ADP Lemco, Inc.
  - c. Aywon.
  - d. Bangor Cork Company, Inc.
  - e. Best-Rite Manufacturing.
  - f. Claridge Products and Equipment, Inc.
  - g. Egan Visual Inc.
  - h. Ghent Manufacturing, Inc.
  - i. Marsh Industries, Inc.; Visual Products Group.
  - j. Platinum Visual Systems; a division of ABC School Equipment, Inc.
  - k. PolyVision Corporation; a Steelcase company.
  - l. Tri-Best Visual Display Products.
2. Manufacturer's Standard Core: Minimum 1/4-inch thick, with manufacturer's standard moisture-barrier backing.
3. Laminating Adhesive: Manufacturer's standard, moisture-resistant thermoplastic type.
4. Size as indicated on Drawings.

### 2.3 TACKBOARD ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. A-1 Visual Systems.
  2. AARCO Products, Inc.
  3. ADP Lemco, Inc.
  4. Aywon.
  5. Bangor Cork Company, Inc.
  6. Best-Rite Manufacturing.
  7. Claridge Products and Equipment, Inc.
  8. Egan Visual Inc.
  9. EverProducts by Glenroy Inc.
  10. Ghent Manufacturing, Inc.
  11. Marsh Industries, Inc.; Visual Products Group.
  12. Platinum Visual Systems; a division of ABC School Equipment, Inc.
  13. PolyVision Corporation; a Steelcase company.
  14. Tri-Best Visual Display Products.
- B. Vinyl-Fabric-Faced Tackboard: Vinyl fabric factory laminated to 7/16-inch thick fiberboard backing.
- C. Size as indicated on drawings.

## 2.4 MARKERBOARD AND TACKBOARD ACCESSORIES

- A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch thick, extruded aluminum; standard size and shape.
  - 1. Field-Applied Trim: Manufacturer's standard, screw-on trim with security screws.
- B. Marker tray: Manufacturer's standard, continuous.
  - 1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
- C. Map Rail: Provide the following accessories:
  - 1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 2-inches wide.
  - 2. End Stops: Located at each end of map rail.

## 2.5 FABRICATION

- A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.
- B. Visual Display Boards: Field assemble visual display boards unless otherwise indicated.
- C. Field-Assembled Visual Display Units: Coordinate field-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.
  - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
  - 2. Provide manufacturer's standard vertical-joint system between abutting sections of markerboards.
- D. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.

## 2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls for proper preparation and backing for visual display surfaces.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display boards, including dirt, mold, and mildew.
- C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display surfaces and wall surfaces.
  - 1. Prepare substrates indicated to receive visual display wall covering as required by manufacturer's written instructions to achieve a smooth, dry, clean, structurally sound surface that is uniform in color.
  - 2. Prime wall surfaces indicated to receive visual display wall coverings and as recommended in writing by primer/sealer manufacturer and wall covering manufacturer.

### 3.3 INSTALLATION, GENERAL

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
  - 1. Mounting Height - Adult at 36-inches above finished floor to top of marker tray.

### 3.4 INSTALLATION OF FIELD-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16-inches o.c. Secure both top and bottom of boards to walls.
  - 1. Field-Applied Aluminum Trim: Attach trim over edges of visual display boards and conceal grounds and clips. Attach trim to boards with fasteners at not more than 24-inches o.c.
    - a. Attach marker trays to boards with fasteners at not more than 12-inches o.c.

### 3.5 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16-inches o.c. Secure both top and bottom of boards to walls.
  - 1. Field-Applied Aluminum Trim: Attach trim over edges of visual display boards and conceal grounds and clips. Attach trim to boards with fasteners at not more than 24-inches o.c.
    - a. Attach trays to boards with fasteners at not more than 12-inches o.c.

### 3.6 CLEANING AND PROTECTION

- A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display surfaces after installation and cleaning.

### 3.7 INSTALLATION OF VISUAL DISPLAY WALL PANELS

- A. Marker Wall Sheets: Attach wall sheets to wall surface with thin layer of adhesive over entire wall surface. Butt join adjacent panels.
- B. Tack Wall Panels: Attach panels to wall surface with egg-size adhesive gobs at 16-inches o.c. horizontally and vertically.
  - 1. Install wrapped-edge wall panels with butt joints between adjacent wall panels.
  - 2. Join adjacent wall panels with exposed, H-shaped aluminum trim covered with same fabric as wall panels.

3.8 After installation, clean visual display wall covering according to manufacturer's written instructions. Remove excess adhesive at finished seams, perimeter edges, and adjacent  
DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain motor-operated, sliding visual display units.

END OF SECTION 101100

SECTION 101416 - PLAQUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes plaques.
  - 1. Furnish and install one new plaque in Lobby.
- B. Accessible: In accordance with the accessibility standard.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For plaques.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show plaque mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each plaque at least half size.
- C. Samples: For each type of plaque showing all components and with the required finishes, in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Plaques: Full size shop drawing showing all details associated with plaque.
  - 2. Exposed Accessories: Full-size Sample or Half-size Sample of each accessory type.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For plaques to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
  - 2. Warranty Period: For life of the building.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 PLAQUES (INTERIOR)

- A. Cast Plaque: Plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide A.R.K. Ramos, or a comparable product by one of the following:
    - a. Advance Corporation; Braille-Tac Division.
    - b. Gemini Incorporated.
    - c. Matthews International Corporation; Bronze Division.
    - d. Metal Arts; Div. of L&H Mfg. Co.
    - e. Mills Manufacturing Company.
    - f. Nelson-Harkins Industries.
    - g. The Southwell Company.
- B. Cast Plaques: Provide castings free of pits, scale, sand holes, and other defects, as follows:
  - 1. Plaque Material: Bronze (BR-400).
  - 2. Background Texture: Manufacturer's standard stipple texture.
  - 3. Border Style: Number 504.

4. Mounting: Concealed studs for substrates encountered.
5. Thickness: 1/2-inch minimum.

C. Plaque Schedule:

- a. Plaque Size: As indicated on Drawings.
- b. Character Size: As scaled from Drawings.
- c. Text/Message/Graphic: As indicated on Drawings. Coordinate exact names, titles, graphics, etc with Architect for final approval.
- d. Quantity: One (1).

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. Plaque Mounting Fasteners:
  - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of plaque, screwed into back of plaque, or screwed into tapped lugs cast integrally into back of plaque, unless otherwise indicated.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION

A. General: Provide manufacturer's standard plaques according to requirements indicated.

1. Preassemble plaques in the shop to greatest extent possible. Disassemble plaques only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.
6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.



- B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted plaques to suit plaque construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

- 1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match plaque-background color unless otherwise indicated.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## 2.6 COPPER-ALLOY FINISHES

- A. Cast-Bronze Character Finishes: Manufacturer's standard satin finish with exposed surfaces free from porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
- B. Cast-Bronze Plaque Finishes: Exposed surfaces free of porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
  - 1. Raised Areas: Hand-tool and buff borders and raised copy to produce manufacturer's standard polished finish.
  - 2. Background Finish: Dark oxidized (interior plaque).
- C. Clear Protective Coating: Coat exposed surfaces of copper alloys with manufacturer's standard, clear organic coating specially designed for coating copper-alloy products.

## 2.7 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of plaque work.
- B. Verify that plaque-support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install plaques using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
  - 2. Install plaques so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.
  - 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Accessible Plaques: Install in locations on walls as indicated and according to accessibility standard.
- C. Mounting Methods:
  - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of plaque. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place plaque in position and push until flush to surface, embedding studs in holes. Temporarily support plaque in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place plaque in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

2. Brackets: Bracket mounting is also acceptable. If bracket-mounting selected, remove loose debris from substrate surface and install bracket supports in position so that plaque is correctly located and aligned. Back of plaque shall be flush with surface of wall.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed plaques and plaques that do not comply with specified requirements. Replace plaques with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as plaques are installed.
- C. On completion of installation, clean exposed surfaces of plaques according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain plaques in a clean condition during construction and protect from damage until acceptance by Government.

END OF SECTION 101416

## SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Cast dimensional characters.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For dimensional letter signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Dimensional Characters: Full-size Sample of each type of dimensional character.
  - 2. Exposed Accessories: Full-size Sample of each accessory type.
- E. Sign Schedule: Use same designations specified or indicated on Drawings.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Sample Warranty: For special warranty.

### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

### 1.7 FIELD CONDITIONS

- A. Field Measurements: Verify locations of electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

### 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Separation or de-lamination of sheet materials and components.
  - 2. Warranty Period: Twenty (20) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior dimensional characters, allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 2.2 DIMENSIONAL CHARACTERS

- A. Cast Characters: Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. ACE Sign Systems, Inc.
  - b. APCO Graphics, Inc.
  - c. A. R. K. Ramos Signage Systems.
  - d. ASI Sign Systems, Inc.
  - e. Gemini Incorporated.
2. Character Material: Cast aluminum.
3. Character Height: 15-inches minimum.
4. Thickness: 0.5-inch, minimum.
5. Finishes:
  - a. Integral Aluminum Finish: As selected by Architect from complete range of manufacturer's standard choices.
6. Mounting: Projecting studs.
7. Typeface: As selected by Architect from complete range of manufacturer's standard choices.
8. Provide dimensional character signage to be mounted on the building façade as indicated on the Drawings.

## 2.3 DIMENSIONAL CHARACTER MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.
- B. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- D. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

## 2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. For exterior exposure, furnish nonferrous-metal devices unless otherwise indicated.
  3. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

4. Sign Mounting Fasteners:

- a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## 2.7 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  - 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
  - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.



### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish.
- D. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101419

## SECTION 101423 - PANEL SIGNAGE

## 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. Panel signs.
2. Room-identification signs.
3. Vinyl stenciling (room identification letters and/or numbers) of all detention openings.
4. Hand-painted room name and/or number at each door inside the secure perimeter.
5. Exterior sign, of aluminum construction with changeable face.

## B. Related Requirements:

1. Section 220553 - "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
2. Section 230553 - "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.
3. Section 260553 - "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.

## 1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
  1. Include fabrication and installation details and attachments to other work.
  2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  3. Show message list, tpestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Panel Signs: Full-size Sample.
  - 2. Room-Identification Signs: Full-size Sample.
- E. Sign Schedule: Use same designations specified or indicated on Drawings.
- F. Conduct a sign coordination meeting to verify names, letters, digits, etc. for each sign, including extra signage noted.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Sample Warranty: For special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

#### 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.

- c. Separation or delamination of sheet materials and components.
- 2. Warranty Period: Five (5) years from date of Substantial Completion for interior panel signs.
- 3. Warranty Period: Two (2) years from date of Substantial Completion for exterior panel signs.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

### 2.2 INTERIOR PANEL SIGNS

- A. Basis-of-Design Product: Drawings and details are based on Photopolymer ADA Identification Signage as manufactured by InPro® Corporation. Subject to compliance with requirements, comparable products manufactured by one of the following may be considered for incorporation into the work of this project, as judged solely by the Architect. The burden of proof is the responsibility of the proposer.
  - 1. Ace Sign Systems, Inc.
  - 2. APCO Graphics, Inc.
  - 3. ASI Signage, Inc.
- B. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated to acrylic backing sheet to produce composite sheet.
    - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
    - b. Surface-Applied Graphics: Applied vinyl film.
    - c. Subsurface Graphics: Reverse halftone or dot-screen image.
    - d. Color(s): Up to three (3) colors as selected by Architect from manufacturer's full range.
  - 2. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: Square cut.
    - b. Corner Condition in Elevation: Square.
  - 3. Mounting: Manufacturer's standard method for substrates indicated.

4. Text and Typeface: Typeface as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color, and finish Braille to match background color.

## 2.3 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Paint for hand-painting of names / numbers: See Section 099123 "Interior Painting".
- C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

## 2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
- B. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.5 EXTERIOR PANEL SIGNS

- A. Basis-of-Design Product: Drawings and details are based on "Flat Face Messenger Series" as manufactured by ASI Signage, Inc. Subject to compliance with requirements, comparable products manufactured by one of the following may be considered for incorporation into the work of this project, as judged solely by the Architect.
  1. Ace Sign Systems, Inc.
  2. APCO Graphics, Inc.
  3. InPro Corporation.
- B. Messenger Wall Mount Signs: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  1. Materials and Components:
    - a. Aluminum Panels: Extruded aluminum, alloy 6063, with high temperature cured polyester color coating wall mount sign 3/64-inch.

2. Surface Treatment Finish: Manufacturer's standard two-phase finishing process. Colors as selected from manufacturer's standard colors.
  - a. Phase One: Chromatized priming with 2u depth chrome layer for optimum surface coat adhesion and weatherability.
  - b. Phase Two: Painting process employing two component, water-based, non-toxic, lead-free, zero emissions, high temperature cured polyester coating of 20-30u depth.
3. Sign-Panel Perimeter: Finish edges smooth.
  - a. Edge Condition: Square cut.
  - b. Corner Condition in Elevation: Square.
4. Mounting: Manufacturer's standard method for substrates indicated.
5. Panel color: Specify from manufacturer's standard color chart.
6. Graphic technique:
  - a. Screen process direct UV cured digitally printed graphics.
7. Wall Attachment: Painted steel vertical attachment
5. Text and Typeface: Typeface as selected by Architect from manufacturer's full range.
6. Size: Refer to drawings.
7. Locations: Refer to drawings.

## 2.6 INTERIOR PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Paint for hand-painting of names / numbers: See Section 099123 "Interior Painting".
- C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

## 2.7 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

4. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- C. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

## 2.8 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

### 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  2. Install signs so they do not protrude or obstruct according to the accessibility standard.

3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Room-Identification Signs and Other Accessible Signage: Install in locations on according to accessibility standard.
- C. Mounting Methods:
1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
  2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- D. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages, and apply and firmly press characters into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.
- E. Hand Painted Room Names and Numbers:
1. General: Paint door opening number on both sides of all door frames within the secure perimeter of the jail.
    - a. Openings with electric hardware. Door number shall match door number security systems uses on the touch screen control panels to identify doors.
    - b. Use vinyl stencils with light adhesive for all hand painted signs.
  2. Day Room Doors: Field-Applied, Vinyl-Character letters (matching the room designation on drawings) approximately 24-inches high on glass transom above the door.
  3. Day Room Wall: At one location to be designated by the Architect: Paint a letter (matching the room designation on drawings) approximately 36-inches high on the wall.
  4. Door Frames: Provide a hand painted alpha-numeric designation on frame above each door (except day-room doors) inside the secure perimeter of the jail. The alpha-numeric designation (ie: C-1) shall be centered over the door and sized as per the drawings.
  5. Style of characters shall be Helvetica unless otherwise indicated.
  6. Proportions of the letters (width factor) shall be normal width to height.
  7. Provide additional hand painted signage and graphics as indicated on the drawings, including but not limited to "directional arrows and flame" graphics for fire emergencies.

### 3.3 ADJUSTING AND CLEANING



- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

ROOM SIGNAGE SCHEDULE				
ROOM NUMBER	ROOM NAME	SIGN TYPE	TEXT	NOTES
A1000	VEHICLE SALLYPORT	F	Do Not Move Inmates Unit Exterior Doors Have Closed	
A1000	VEHICLE SALLYPORT	E	If You Need Medical Help Or Are Sick Or Injured , Contact The Officer, Be Sure To Read Your Handbook For Other Medical Procedures	
A1001	STORAGE	A	Storage	
A1002	EVIDENCE STORAGE	A	Evidence Storage	
A1003	VEHICLE EVIDENCE STORAGE	A	Vehicle Evidence Storage	
A2000	OPEN STORAGE	A	Storage	
A2001	EVIDENCE	A	Storage	
B1000	VESTIBULE			
B1001	LOBBY	I	To Obtain A Key For A Locker Present Your ID To Master Control. When You Are Done With The Locker , Return The Locker Key In Exchange For Your ID.	
B1002	WAITING	C	Visitation Rules	Refer to Sheet A-650 Detail C for sign narrative
B1002	WAITING	D	If You Have Just Given The Person You Visited Disappointing News Or If The Person You Visited Seems Depressed Please Inform A Correctional Officer	
B1003	VIDEO VISITATION	G	No Food Or Beverage Permitted In Video Visitation	
B1003	VIDEO VISITATION	G	No Cell Phones, Cameras Or Other Electrical Recording Devices Permitted In Video Visitation	
B1003	VIDEO VISITATION	G	Violation Of These Rules May Result In Loss Of Visitation Privileges	
B1004	GROUP VIDEO	A	Group Video	

B1005	GROUP VIDEO	A	Group Video	
B1006	GROUP VIDEO	A	Group Video	
B1007	JANITOR	A	Janitor	
B1008	WOMENS	B	Womens	Add ADA Graphic
B1009	MENS	B	Mens	Add ADA Graphic
B1010	PUBLIC VISITATION	A	Public Visitation	
B1011	PUBLIC VISITATION	A	Public Visitation	
B1012	PUBLIC VISITATION	A	Public Visitation	
B1013	PUBLIC VISITATION - ADA	A	Public Visitation	Add ADA Graphic
B1015	INTERLOCK	A	Interlock	Two Signs
B1016	MASTER CONTROL	A	Master Control	
B1017	TOILET	A	Toilet	
B1018	ATTORNEY CONFERENCE	A	Attorney Conference	
B1019	ATTORNEY CONFERENCE	A	Attorney Conference	
B1020	INMATE VISITATION - ADA	A	Inmate Visitation	Add ADA Graphic
B1021	INMATE VISITATION	A	Inmate Visitation	
B1022	INMATE VISITATION	A	Inmate Visitation	
B1023	INMATE VISITATION	A	Inmate Visitation	
B1024	ELECTRICAL	A	Electrical	
B1025	SECURE CORRIDOR			
B1026	WOMENS	B	Womens	Add ADA Graphic
B1027	MENS	B	Mens	Add ADA Graphic
B1028	ELECTRICAL	A	Electrical	
B1029	CORRIDOR	A	Corridor	
B1030	JANITOR	A	Janitor	
B1031	STAFF TOILET	B	Staff Toilet	Add ADA Graphic
B1032	INMATE PROPERTY STORAGE	A	Inmate Property Storage	
B1033	SEARCH TOILET SHOWER	A	Search Toilet Shower	
B1034	SEARCH TOILET SHOWER	A	Search Toilet Shower	
B1035	BODY SCANNER	A	Body Scanner	
B1037	DAYROOM	H	Dayroom Designation	Not Finalized
B1038	DAYROOM	H	Dayroom Designation	Not Finalized
B1039	CELL	H	Cell Number	Not Finalized
B1040	CELL	H	Cell Number	Not Finalized
B1041	CELL	H	Cell Number	Not Finalized

B1042	CELL	H	Cell Number	Not Finalized
B1043	INMATE CLOTHING	A	Inmate Clothing	Two Signs
B1044	CELL ADA	H	Cell Number	Not Finalized
B1045	CELL ADA	H	Cell Number	Not Finalized
B1046	CELL	H	Cell Number	Not Finalized
B1047	PADDED CELL	H	Padded Number	Not Finalized
B1048	TOILET / SHOWER	A	Toilet/Shower	ADA Graphic
B1049	PADDED CELL	H	Padded Number	Not Finalized
B1050	PADDED CELL	H	Padded Number	Not Finalized
B1051	TOILET / SHOWER	AB	Toilet Number	Not Finalized
B1052	PADDED CELL	H	Padded Number	Not Finalized
B1053	INTAKE CENTER	A	Intake Number	Not Finalized
B1053A	BOOKING COUNTER	A	Booking Number	Not Finalized
B1054	FEMALE DETOX	A	Female Dedtox	
B1055	INTERLOCK	A	Interlock/Testing	
B1056	TESTING	A	Testing Number	
B1057	MEDICAL PRE-SCREENING	A	Medical Pre-Screening	
B1058	MEDICAL PRE-SCREENING	A	Medical Pre-Screening	
B1059	TOILET SHOWER	A	Toilet/Shower	Add ADA Graphic
B1060	MAIN DATA FRAME		Main Data Frame	Exterior
B1061	MALE DETOX	A	Male Detox	
B1062	TRANSPORTATION WAITING	A	Transportation Waiting	
B1063	INTERLOCK	A	Interlock	Two Signs
B1064	TRANSPORTATION OFFICE	A	Transportation Office	
B1065	TOILET	A	Toilet	Add ADA Graphic
B1066	TOILET	A	Toilet	Add ADA Graphic
B1067	INTERLOCK	A	Interlock	Two Signs
B1068	CORRIDOR	A	Corridor	
B1069	CLOSET	A	Closet	
B1070	PRETRIAL SERVICES OFFICE	A	Pretrial Services Office	
B1071	PRETRIAL SERVICES OFFICE	A	Pretrial Services Office	
B1072	PRETRIAL SERVICES OFFICE	A	Pretrial Services Office	
B1073	PRETRIAL SERVICES OFFICE	A	Pretrial Services Office	

B1074	PRETRIAL SERVICES WORKROOM	A	Pretrial Services Workroom	
B1075	TOILET	A	Toilet	
B1076	TOILET	A	Toilet	
B1077	CELL	H	Cell	Not Finalized
B1078	CELL	H	Cell	Not Finalized
B1079	CELL	H	Cell	Not Finalized
B1080	CELL	H	Cell	Not Finalized
B1081	CELL	H	Cell	Not Finalized
B1082	CELL	H	Cell	Not Finalized
B1083	CELL	H	Cell	Not Finalized
B1084	STORAGE	A	Storage	
B1085	JAIL STORAGE	A	Jail Storage	
B1086	CELL	H	Cell	Not Finalized
B1087	CELL	H	Cell	Not Finalized
B1088	CELL	H	Cell	Not Finalized
B1089	CELL	H	Cell	Not Finalized
B1090	CELL	H	Cell	Not Finalized
B1091	CELL	H	Cell	Not Finalized
B1092	CELL	H	Cell	Not Finalized
B1093	INTERLOCK	A	Interlock	Two Signs
B1094	STORAGE	A	Storage	
B1095	MALE MEDICAL DAYROOM	H	Male Medical Dayroom	
B1096	WORK STATION	A	Work Station	
B1097	CELL	H	Cell	Not Finalized
B1098	CELL	H	Cell	Not Finalized
B1099	CELL	H	Cell	Not Finalized
B1100	CELL	H	Cell	Not Finalized
B1101	CELL	H	Cell	Not Finalized
B1102	CELL	H	Cell	Not Finalized
B1103	CELL	H	Cell	Not Finalized
B1104	CELL	H	Cell	Not Finalized
B1105	CELL	H	Cell	Not Finalized
B1106	CELL	H	Cell	Not Finalized
B1107	RECREATION			
B1108	JANITOR	A	Janitor	
B1109	PADDED CELL	H	Padded Number	Not Finalized
B1110	TOILET / SHOWER	A	Toilet / Shower	
B1111	PADDED CELL	H	Padded Number	Not Finalized
B1112	FEMALE DAYROOM	H	Female Dayroom	Not Finalized

B1113	FEMALE TOILET SHOWER	A	Female Toilet Shower	
B1114	FEMALE CELL ADA	H	Female Cell ADA	Not Finalized
B1115	FEMALE CELL	H	Female Cell	Not Finalized
B1116	FEMALE CELL	H	Female Cell	Not Finalized
B1117	FEMALE CELL	H	Female Cell	Not Finalized
B1118	FEMALE CELL	H	Female Cell	Not Finalized
B1120	TOILET SHOWER	A	Toilet Shower	
B1121	INTERLOCK	A	Interlock	Two Signs
B1122	MEDICAL WAITING	A	Medical Waiting	
B1123	LACTATION ROOM	A	Lactation Room	
B1124	NURSE	A	Nurse	
B1125	STAFF TOILET	A	Staff Toilet	
B1126	PHARMACY	A	Pharmacy	
B1127	MEDICAL RECORDS	A	Medical Records	
B1128	COUNCILOR	A	Councilor	
B1129	DENTAL	A	Dental	
B1130	EXAM	A	Exam	
B1131	INMATE TOILET	A	Inmate Toilet	
B1132	EXAM	A	Exam	
B1133	JAIL SUPERVISORS	A	Jail Supervisors	
B1134	COURTYARD	A	Courtyard	Exterior Sign
B1135	COURTYARD	A	Courtyard	Exterior Sign
B2000	MECHANICAL	A	Mechanical	
B2001	SECURITY	A	Security	
B2002	ELECTRICAL	A	Electrical	
C1000	WAITING	A	Waiting	
C1001	SEX OFFENDER AND EVICTION OFFICE	A	Sex Offender And Eviction Office	
C1002	SEX OFFENDER REGISTRY	A	Sex Offender Registry	
C1003	CORRIDOR	A	Corridor	
C1004	ELECTRICAL	A	Electrical	
C1005	JANITOR	A	Janitor	
C1006	INTERVIEW	A	Interview	
C1007	INTERVIEW	A	Interview	
C1008	STORAGE	A	Storage	
C1008A	LACTATION	A	Lactation	
C1009	CORRIDOR	A	Corridor	
C1010	ADMIN SUPPORT			
C1011	STORAGE		Storage	
C1012	FILE STORAGE	A	File Storage	

C1013	WORK ROOM	A	Work Room	
C1014	SHARED ADMINISTRATION		Shared Administration	
C1015	CONFERENCE ROOM	A	Conference Room	
C1016	SHERIFF'S OFFICE	A	Sheriff's Office	
C1017	TOILET	A	Toilet	
C1018	CHIEF DEPUTY'S OFFICE	A	Chief Deputy's Office	
C1019	CHIEF DEPUTY'S OFFICE	A	Chief Deputy's Office	
C1020	I.T. OFFICE	A	I.T. Office	
C1021	AGENCY	A	Agency	
C1022	CIVIL	A	Civil	
C1023A	MAIL	A	Mail	
C1023B	CORRIDOR	A	Corridor	
C1023C	CORRIDOR	A	Corridor	
C1024	TOILET / SHOWER	B	Toilet/Shower	Add ADA Graphic
C1025	TOILET / SHOWER	B	Toilet/Shower	Add ADA Graphic
C1026	TOILET / SHOWER	B	Toilet/Shower	Add ADA Graphic
C1027	SQUAD ROOM	A	Squad Room	
C1028	FITNESS	A	Fitness	
C1029	TRAINING OFFICE	A	Training Office	
C1030	BREAK ROOM	A	Break Room	
C1030A	OUTDOOR STAFF DINING		Outdoor Staff Dining	
C1031	CORRIDOR	A	Corridor	
C1031A	ALCOVE		Alcove	
C1032	MENS	B	Mens	Add ADA Graphic
C1033	WOMENS	B	Womens	Add ADA Graphic
C1034	TRAINING ROOM	B	Training Room	Two Signs
C1035	CLOSET	A	Closet	
C1036	VESTIBULE	A	Vestibule	
C1037	CORRIDOR	A	Corridor	
C1038	ARMORY	A	Armory	
C1039	DEF TAC STORAGE	A	Def Tac Storage	
C1039	CELL ADA		Cell Ada	
C1040	CID WORK GROUP	A	CID Work Group	
C1041	CID STORAGE	A	CID Storage	
C1042	CID SUPERVISOR OFFICE	A	CID SUPERVISOR OFFICE	
C1043	CID SUPERVISOR OFFICE	A	CID SUPERVISOR OFFICE	

C1044	INTERLOCK	A	Interlock	
C1045	EVIDENCE PREP.	A	Evidence Preparation	
C1046	SECURITY	A	Security	
C1047	EVIDENCE PROCESS	A	Evidence Process	Two Signs
C1047B	DARK ROOM LAB	A	Dark Room Lab	
C1048	EVIDENCE OFFICE	A	Evidence Office	
C1049	EVIDENCE STORAGE		Evidence Storage	
C1050	GUNS	A	Guns	
C1051	DRUGS	A	Drugs	
C1052	RECEIVING	A	Receiving	
C1053	MECHANICAL	A	Mechanical	
C1054	ELECTRICAL	A	Electrical	
C1055	FACILITY OFFICE	A	Facility Office	
C1056	FACILITY WORKSHOP	A	Facility Workshop	
C1057	STORAGE	A	Storage	
C1059	KITCHEN	A	Kitchen	
C1060	INMATE TOILET	A	Inmate Toilet	
C1061	STAFF TOILET	A	Staff Toilet	
C1062	OFFICE	A	Office	
C1063	INTERLOCK		Interlock	
C1064	DRY STORAGE	A	Dry Storage	
C1065	LAUNDRY	A	Laundry	
C1065B	DRYER CHASE	A	Dryer Chase	
C1066	TRASH	A	Trash	
C1067	PASSAGE	A	Passage	
C1068	ATTORNEY	A	Attorney	
C1069	JUDGE	A	Judge	
C1070	VIDEO ARRAIGNMENT	A	Video Arraignment	Two Signs
C1071	VIDEO ARRAIGNMENT	A	Video Arraignment	Two Signs
C1072	VIDEO ARRAIGNMENT WAITING	A	Video Arraignment Waiting	
C1073	VIDEO ARRAIGNMENT WAITING	A	Video Arraignment Waiting	Two Signs
C1074	INMATE/ ATTORNEY CONFERENCE	A	Inmate/ Attorney Conference	
C1075	INMATE/ ATTORNEY CONFERENCE	A	Inmate/ Attorney Conference	
C1076	JANITOR	A	Janitor	
C1077	JAIL COMMANDER	A	Jail Commander	
C1078	ASSISTANT JAIL COMMANDER	A	Assistant Jail Commander	
C1079	SECURITY	A	Security	



C1080	MATRON	A	Matron	
D0001	STAFF TOILET	A	Staff Toilet	
D0002	MECHANICAL	A	Mechanical	
D1000	1 CONTROL	H	1 Control	
D1001A	INTERLOCK	H	Interlock	
D1001B	INTERLOCK	H	Interlock	
D1002A	INTERLOCK	H	Interlock	
D1002B	INTERLOCK	H	Interlock	
D1003	INTERLOCK	H	Interlock	Two Signs
D1004	JANITOR	H	Janitor	
D1005	1 INDOOR/OUTDOOR RECREATION	H	1 Indoor/Outdoor Recreation	
D1005B	STORAGE	H	Storage	
D1006	1 CLASSROOM	H	1 Classroom	
D1007	TOILET / SHOWER	H	Toilet / Shower	
D1008	TOILET / SHOWER	H	Toilet / Shower	
D1009	CONFERENCE ROOM	H	Conference Room	
D1010	IT	H	It	
D1011	INTERLOCK	H	Interlock	Two Signs
D1012	SECURE CORRIDOR	H	Secure Corridor	
D1012A	STORAGE	H	Storage	
D1013	INTERLOCK	H	Interlock	
D1014	INMATE TOILET	H	Inmate Toilet	
D1016	INTERLOCK	H	Interlock	
D1020	1 - A	H	1 - A	
D1021	CELL	H	Cell	Not Finalized
D1022	CELL	H	Cell	Not Finalized
D1023	CELL	H	Cell	Not Finalized
D1024	CELL ADA	H	Cell ADA	Not Finalized
D1030	1 - B	H	1 - B	
D1031	CELL	H	Cell	Not Finalized
D1032	CELL ADA	H	Cell ADA	Not Finalized
D1040	1 - C	H	1 - C	
D1041	CELL ADA	H	Cell ADA	Not Finalized
D1042	CELL	H	Cell	Not Finalized
D1043	CELL	H	Cell	Not Finalized
D1050	1 - D	H	1 - D	
D1051	CELL	H	Cell	Not Finalized
D1052	CELL	H	Cell	Not Finalized
D1053	CELL	H	Cell	Not Finalized
D1054	CELL ADA	H	Cell ADA	Not Finalized
D1060	1 - E	H	1 - E	

D1061	CELL ADA	H	Cell ADA	Not Finalized
D1062	CELL	H	Cell	Not Finalized
D1070	1 - F	H	1 - F	
D1071	CELL	H	Cell	Not Finalized
D1072	CELL ADA	H	Cell ADA	Not Finalized
D1080	1 - G	H	1 - G	
D1081	CELL ADA	H	Cell ADA	Not Finalized
D1082	CELL	H	Cell	Not Finalized
D1083	CELL	H	Cell	Not Finalized
D1084	CELL	H	Cell	Not Finalized
D1090	1 - H	H	1 - H	
D1091	CELL	H	Cell	Not Finalized
D1092	CELL	H	Cell	Not Finalized
D1093	CELL ADA	H	Cell ADA	Not Finalized
D1110	1 - J	H	1 - J	
D1111	CELL ADA	H	Cell ADA	Not Finalized
D1112	CELL	H	Cell	Not Finalized
D1120	1 - K	H	1 - K	
D1121	CELL ADA	H	Cell ADA	Not Finalized
D1122	CELL	H	Cell	Not Finalized
D1123	CELL	H	Cell	Not Finalized
D1124	CELL	H	Cell	Not Finalized
D1125	CELL	H	Cell	Not Finalized
D1126	CELL	H	Cell	Not Finalized
D2021	CELL	H	Cell	Not Finalized
D2022	CELL	H	Cell	Not Finalized
D2023	CELL	H	Cell	Not Finalized
D2024	CELL	H	Cell	Not Finalized
D2031	CELL	H	Cell	Not Finalized
D2032	CELL	H	Cell	Not Finalized
D2041	CELL	H	Cell	Not Finalized
D2042	CELL	H	Cell	Not Finalized
D2043	CELL	H	Cell	Not Finalized
D2051	CELL	H	Cell	Not Finalized
D2052	CELL	H	Cell	Not Finalized
D2053	CELL	H	Cell	Not Finalized
D2054	CELL	H	Cell	Not Finalized
D2061	CELL	H	Cell	Not Finalized
D2062	CELL	H	Cell	Not Finalized
D2071	CELL	H	Cell	Not Finalized
D2072	CELL	H	Cell	Not Finalized
D2081	CELL	H	Cell	Not Finalized

D2082	CELL	H	Cell	Not Finalized
D2083	CELL	H	Cell	Not Finalized
D2084	CELL	H	Cell	Not Finalized
D2091	CELL	H	Cell	Not Finalized
D2092	CELL	H	Cell	Not Finalized
D2093	CELL	H	Cell	Not Finalized
D2111	CELL	H	Cell	Not Finalized
D2112	CELL	H	Cell	Not Finalized
D2121	CELL	H	Cell	Not Finalized
D2122	CELL	H	Cell	Not Finalized
D2123	CELL	H	Cell	Not Finalized
D2124	CELL	H	Cell	Not Finalized
D2125	CELL	H	Cell	Not Finalized
D2126	CELL	H	Cell	Not Finalized
E0001	STAFF TOILET	A	Staff Toilet	
E0002	MECHANICAL	A	Mechanical	
E1000	1 CONTROL	H	1 Control	
E1001A	INTERLOCK	H	Interlock	
E1001B	INTERLOCK	H	Interlock	
E1002A	INTERLOCK	H	Interlock	
E1002B	INTERLOCK	H	Interlock	
E1003	INTERLOCK	H	Interlock	Two Signs
E1004	IT	H	It	
E1005	CONFERENCE ROOM	H	Conference Room	
E1006	TOILET / SHOWER	H	Toilet / Shower	
E1007	TOILET / SHOWER	H	Toilet / Shower	
E1008	2 CLASSROOM	H	2 Classroom	
E1009	2 INDOOR/OUTDOOR RECREATION	H	2 Indoor/Outdoor Recreation	
E1009B	STORAGE	H	Storage	
E1010	INTERLOCK	H	Interlock	Two Signs
E1011	JANITOR	H	Janitor	
E1012	SECURE CORRIDOR	H	Secure Corridor	
E1013	INTERLOCK	H	Interlock	Two Signs
E1016B	STORAGE	H	Storage	
E1017	INTERLOCK	H	Interlock	
E1020	2 - K	H	2 - K	
E1021	CELL	H	Cell	Not Finalized
E1022	CELL	H	Cell	Not Finalized
E1023	CELL	H	Cell	Not Finalized
E1024	CELL	H	Cell	Not Finalized
E1025	CELL	H	Cell	Not Finalized

E1026	CELL ADA	H	Cell ADA	Not Finalized
E1030	2 - J	H	2 - J	
E1031	CELL	H	Cell	Number Not Finalized at this Time
E1032	CELL ADA	H	Cell ADA	Not Finalized
E1040	2 - H	H	2 - H	
E1041	CELL ADA	H	Cell ADA	Not Finalized
E1042	CELL	H	Cell	Not Finalized
E1043	CELL	H	Cell	Not Finalized
E1050	2 - G	H	2 - G	
E1051	CELL	H	Cell	Not Finalized
E1052	CELL	H	Cell	Not Finalized
E1053	CELL	H	Cell	Not Finalized
E1054	CELL ADA	H	Cell ADA	Not Finalized
E1060	2 - F	H	2 - F	
E1061	CELL ADA	H	Cell ADA	Not Finalized
E1062	CELL	H	Cell	Not Finalized
E1070	2 - E	H	2 - E	
E1071	CELL	H	Cell	Not Finalized
E1072	CELL ADA	H	Cell ADA	Not Finalized
E1080	2 - D	H	2 - D	
E1081	CELL ADA	H	Cell ADA	Not Finalized
E1082	CELL	H	Cell	Not Finalized
E1083	CELL	H	Cell	Not Finalized
E1084	CELL	H	Cell	Number Not Finalized at this Time
E1090	2 - C	H	2 - C	Not Finalized
E1091	CELL	H	Cell	Not Finalized
E1092	CELL	H	Cell	Not Finalized
E1093	CELL ADA	H	Cell ADA	Not Finalized
E1110	2 - B	H	2 - B	
E1111	CELL ADA	H	Cell ADA	Not Finalized
E1112	CELL	H	Cell	Not Finalized
E1120	2 - A	H	2 - A	
E1121	ADA CELL	H	ADACell	Not Finalized
E1122	CELL	H	Cell	Not Finalized
E1123	CELL	H	Cell	Not Finalized
E1124	CELL	H	Cell	Not Finalized
E2021	CELL	H	Cell	Not Finalized
E2022	CELL	H	Cell	Not Finalized
E2023	CELL	H	Cell	Not Finalized

E2024	CELL	H	Cell	Not Finalized
E2025	CELL	H	Cell	Not Finalized
E2026	CELL	H	Cell	Not Finalized
E2031	CELL	H	Cell	Not Finalized
E2032	CELL	H	Cell	Not Finalized
E2041	CELL	H	Cell	Not Finalized
E2042	CELL	H	Cell	Not Finalized
E2043	CELL	H	Cell	Not Finalized
E2051	CELL	H	Cell	Not Finalized
E2052	CELL	H	Cell	Not Finalized
E2053	CELL	H	Cell	Not Finalized
E2054	CELL	H	Cell	Not Finalized
E2061	CELL	H	Cell	Not Finalized
E2062	CELL	H	Cell	Not Finalized
E2071	CELL	H	Cell	Not Finalized
E2072	CELL	H	Cell	Not Finalized
E2081	CELL	H	Cell	Not Finalized
E2082	CELL	H	Cell	Not Finalized
E2083	CELL	H	Cell	Not Finalized
E2084	CELL	H	Cell	Not Finalized
E2091	CELL	H	Cell	Not Finalized
E2092	CELL	H	Cell	Not Finalized
E2093	CELL	H	Cell	Not Finalized
E2111	CELL	H	Cell	Not Finalized
E2112	CELL	H	Cell	Not Finalized
E2121	CELL	H	Cell	Not Finalized
E2122	CELL	H	Cell	Not Finalized
E2123	CELL	H	Cell	Not Finalized
E2124	CELL	H	Cell	Not Finalized

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## SECTION 101426 - POST AND PANEL/PYLON SIGNAGE

## 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. Nonilluminated post and panel signs.
- B. Related Requirements:
  - 1. Section 033000 - "Cast-in-Place Concrete" for concrete foundations, concrete fill in postholes, and setting anchor bolts in concrete foundations for signs.

## 1.3 COORDINATION

- A. Furnish templates and tolerance information for placement of sign-anchorage devices embedded in permanent construction by other installers.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For post and panel/pylon signage.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 3. Show message list, typestyles, graphic elements, and layout for each sign.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly, showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Post and Panel Signs: Not less than 12-inches square, including corner and post.

- E. Sign Schedule: Use same designations indicated on Drawings.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Sample Warranty: For special warranty.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

## 1.7 QUALITY ASSURANCE

- A. Supplier: Obtain all products in this section from a single supplier.
- B. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
    - c. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: Two (2) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 POST AND PANEL/PYLON SIGNS

- A. Acceptable Manufacturers:
  - 1. ASI Signage, 3860 W. Northwest Highway, Suite 350, Dallas, TX 75220; (214) 352- 9140
  - 2. Indiana Sign, 1391 Production Rd., Fort Wayne, IN 46774; (260) 407-4165
  - 3. Innerface Architectural Signage, 5849 Peachtree Rd., Atlanta, GA 30341; (800) 445-4796



B. Acceptable Product: Exterior Panel Sign System, with the following mounting options:

1. Double Post and Panel Signs:

- a. Panel size: see drawing.
- b. Panel type: Regular panel, 1" wide.
- c. Panel Attachment Type: Top loading panels.
- d. Posts

1) Round Posts: 3-1/2" diameter, one-channel posts.

e. Mounting:

1) Manufacturer's standard galvanized steel ground sleeve.

## 2.2 MATERIALS

A. Materials and Components

- 1. Aluminum Panels: Meeting ASTM B209, alloy EN 5052 H12, minimum 0.05" thick.
- 2. Aluminum Extrusions: Meeting ASTM B221, alloy 6063-T5.
- 3. Accessories: Provide end caps, couplings, coupling fittings, mounting fittings, interchangeable fittings, and other hardware and accessories for a complete installation.

C. Finish: Manufacturer's standard two-phase, high temperature cured polyester color coating as follows:

- 1. Primer: 2 mil thick chromium layer for optimum surface coat adhesion and weatherability.
- 2. Top Coat: Two-component, water-based, non-toxic, lead-free, zero emissions, high temperature cured polyester coating of 2-3 mil thickness.
- 3. Colors: As selected from manufacturer's standard colors.

## 2.3 FABRICATION

- A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Allow for thermal movement resulting from a maximum ambient temperature change (range) of 100 deg F (38 deg C). Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners.
- C. Mill joints to a tight, hairline fit. Form joints exposed to the weather to exclude water penetration.

- D. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.
- E. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.
- F. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.
- G. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.
- H. Increase material thickness or reinforce with concealed stiffeners or backing materials as required to produce surfaces without distortion, buckles, warp, or other surface deformations.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.
- B. Scheduling of installation by Owner or its representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

#### 3.2 INSTALLATION

- A. Install product in accordance with supplier's instructions.
- B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.
- C. Install product level, plumb, and at heights indicated.
- D. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.
- E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:
  - 1. Within 1 inch vertically and horizontally of intended location.

#### 3.3 INSTALLING POSTS

- A. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet

## B. Direct-Burial Method:

1. Excavation: Excavate posthole to dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, frost, rain, accumulated water, or construction activities by excavating an additional [12 inches (300 mm)], backfilling with satisfactory soil or well-graded aggregate, and compacting to original subgrade elevation.
2. Setting in Cast-in-Place Concrete: Set post in position, support to prevent movement, and place concrete in posthole as indicated.

## 1.4 CLEANING, PROTECTION, AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 10 feet.
- B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

END OF SECTION 101426

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## SECTION 102113 - TOILET COMPARTMENTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Powder-coated steel floor-mounted style configured as toilet enclosures.
  - 2. Powder-coated steel urinal screens.
- B. Related Sections:
  - 1. Section 102800 "Toilet, and Bath Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locations of cutouts for compartment-mounted toilet accessories.
  - 2. Show locations of reinforcements for compartment-mounted grab bars.
  - 3. Show locations of centerlines of toilet fixtures.
- C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and accessories involving material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
  - 1. Each type of material, color, and finish required for units, prepared on 6-inch square samples of same thickness and material indicated for Work.
  - 2. Each type of hardware and accessory.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment, from manufacturer.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete."
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
  - 1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z (03G).
  - 2. Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvanized.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- E. Stainless-Steel Castings: ASTM A 743/A 743M.
- F. Zamac: Not allowed.

## 2.2 STEEL UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Accurate Partitions Corporation.
  2. All American Metal Corp.
  3. American Sanitary Partition Corporation.
  4. Ampco, Inc.
  5. Bradley Corporation; Mills Partitions.
  6. Flush Metal Partition Corp.
  7. General Partitions Mfg. Corp.
  8. Global Steel Products Corp.
  9. Hadrian Manufacturing Inc.
  10. Knickerbocker Partition Corporation.
  11. Metpar Corp.
  12. Rockville Partitions Incorporated.
  13. Sanymetal; a Crane Plumbing company.
  14. Shanahan's Limited.
- B. Toilet-Enclosure Style: Floor mounted partitions shall be floor anchored with a channel bracket and include an integral leveling bolt to provide proper height adjustment. Two 3/8" diameter zinc-plated studs anchor the pilaster to the concrete floor. Floor anchoring system shall be concealed with a type 304 stainless steel trim shoe with a No. 4 finish.
- C. Urinal-Screen Style: Wall hung, wedge shaped.
- D. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1-inch for doors and panels and 1-1/4-inches for pilasters.
  2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
  3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
- E. Urinal-Screen Construction:
1. Wedge-Shaped, Wall-Hung Urinal Screen: Stainless-steel. V-shaped, fabricated for concealed wall attachment, and maximum 6 inches wide at wall and minimum 1-inch wide at protruding end.
- F. Facing Sheets and Closures: Electrolytically coated or hot-dip galvanized-steel sheet with nominal base-metal (uncoated) thicknesses as follows:

1. Pilasters, Braced at Both Ends: 1-1/4-inches thick by 70-inches high.
    - a. Composition: 18 gage galvanized steel bonded to sound deadening honeycomb core.
  2. Panels: 1-inch thick.
    - a. Composition: Cold rolled 22 gage galvanized steel bonded to sound deadening honeycomb core.
  3. Doors: Manufacturer's standard thickness, but not less than 0.030-inch.
  4. Wedge-Shaped, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.036-inch.
- G. Pilaster Shoes: Stainless-steel sheet, not less than 0.031-inch nominal thickness and 3-inches high, finished to match hardware.
- H. Stainless steel sheet: provide a 24-inches x 24-inches stainless steel sheet on partition adjacent to urinal.
- I. Brackets (Fittings):
1. Stirrup Type: Ear or U-brackets; stainless steel or chrome-plated brass.
- J. Steel-Sheet Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on finish, including thermosetting, electrostatically applied, and powder coatings. Comply with coating manufacturer's written instructions for applying and baking. Apply one color in each room.
1. Color: As selected by Architect from manufacturer's full range.

## 2.3 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
1. Material: Stainless steel or Chrome-plated brass.
  2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
  3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.



6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

## 2.4 FABRICATION

- A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- B. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide, in-swinging doors for standard toilet compartments and 36-inch wide, out-swinging doors with a minimum 32-inch wide, clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2-inch.
    - b. Panels and Walls: 1-inch.
  2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.

- B. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

### 3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113

## SECTION 102132 – WELDING CURTAINS

## 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. This Section includes the following:
  - 1. Curtain tracks and curtain carriers.
  - 2. Welding curtains.
- B. Related Sections include the following:
  - 1. Division 05 Section 055000 - "Metal Fabrications" for metal support framing for mounting curtain tracks.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Curtains: Provide curtain fabrics with the following characteristics:
  - 1. Fabrics are flame resistant and are identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.
    - a. Identify fabrics with appropriate markings of applicable testing and inspecting agency.

## 1.4 SUBMITTALS

- A. Product Data: Include durability, laundry temperature limits, fade resistance, and fire-test-response characteristics for each type of curtain fabric indicated.
  - 1. Include data on each type of applied curtain treatment.
- B. Shop Drawings: Show layout and type of welding curtain, sizes of curtains, number of carriers, anchorage details, and conditions requiring accessories. Indicate dimensions taken from field measurements.
- C. Samples for Initial Selection: For each type of curtain material indicated.

- D. Samples for Verification: For each type of product required, prepared on Samples of size indicated below.
  - 1. Curtain Fabric: 12-inch square swatch or larger as required to show complete pattern repeat, from dye lot used for the Work, with specified treatments applied. Mark top and face of material.
  - 2. Mesh Top: Not less than 4-inches square.
  - 3. Curtain Track: Not less than 4-inches long.
  - 4. Curtain Carrier: Full-size unit.
  - 5. Sample of clear vinyl window material.
- E. Manufacturer Certificates: Signed by manufacturers certifying that products comply with requirements.
- F. Operation and Maintenance Data: For curtains, track, and hardware to include in operation and maintenance manuals.

## 1.5 PROJECT CONDITIONS

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

## PART 2 - PRODUCTS

### 2.1 CURTAIN TRACKS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide track by THT Industries or a comparable product by one of the following:
  - 1. Akon Curtain and Divider., Fernandina Beach, FL.
  - 2. Duracote Corp., Ravenna, OH.
  - 3. Fabri-Tech, Inc., Fishers, IN.
  - 4. Frommelt Safety Products, Dubuque, IA.
  - 5. Johnson Bros. Metal Forming Co., Berkley, IL.
  - 6. TMI Inc., Pittsburgh, PA.
  - 7. Verilon Vinyl, Wheeling, IL.
  - 8. Weld-Action Co., Warren, OH.
- B. Galvanized Steel Track: Dual track, 16 gage not less than 1-1/2-inches wide by 1-3/4-inches high each; with minimum wall thickness of 0.050-inch.
  - 1. Finish: Baked enamel, acrylic, or epoxy.
  - 2. Track shall be one piece, without splices, as much as possible.

- C. Track Accessories: Fabricate splices, end caps, connectors, end stops, coupling and joining sleeves, wall flanges, brackets, ceiling clips, and other accessories from same material and with same finish as track.
  - 1. End Stop: Removable.
  - 2. Fasteners to structure above: Stainless-steel.
- D. Curtain Carriers: Two nylon rollers and metal axle with chrome-plated steel hook.
- E. Track Configuration: Curved Corner Joint, 90 deg corner.

## 2.2 WELDING CURTAINS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Welding Safety Curtain as manufactured by THT Industries or a comparable product by one of the following:
  - 1. Akon Curtain and Divider, Fernandina Beach, FL.
  - 2. Duracote Corp., Ravenna, OH.
  - 3. Fabri-Tech, Inc., Fishers, IN.
  - 4. Frommelt Safety Products, Dubuque, IA.
  - 5. Johnson Bros. Metal Forming Co., Berkley, IL.
  - 6. TMI Inc., Pittsburgh, PA.
  - 7. Verilon Vinyl, Wheeling, IL.
  - 8. Weld-Action Co., Warren, OH
- B. Curtain: Provide a curtain with a 48-inch high bottom section of opaque material, a 48-inch high top section of transparent material. Curtain shall be three sides, designed to part in the corners.
  - 1. Opaque Material: 18 oz flame resistant weld vinyl meeting California State Fire Marshal Code (CSFM) for flame resistance.
  - 2. Tinted Transparent Material: 14 mil weld vinyl which also meets CSFM for flame resistance.
  - 3. Velcro side attachments shall be provided on both sides of each curtain section.
  - 4. Provide a steel chain weight in the bottom hem.
  - 5. Color: As selected by Architect from manufacturer's full range.
- C. Curtain Grommets: Two-piece, rolled-edge, rustproof, nickel-plated brass; spaced not more than 18-inches o.c.; machined into top hem.
- D. Supports: Threaded rod supports and track connector.

## 2.3 WELDING CURTAIN FABRICATION

- A. Fabricate curtains to comply with the following requirements:

1. Width: Equal to track length from which curtain is hung plus 10 percent added fullness, but not less than 12-inches added fullness.
  2. Length: Equal to floor-to-bottom of structure height minus depth of track and carrier at top, and minus distance above the finished floor at bottom as follows:
    - a. Welding Curtains: 12-inches.
  3. Top Hem: Not less than 1-inch and not more than 1-1/2-inches wide, triple thickness, reinforced with integral web, and double lock stitched.
  4. Bottom Hem: Not less than 1-inch and not more than 1-1/2-inches wide, double thickness and double lock stitched.
  5. Side Hems: Not less than 1/2- inch and not more than 1-1/4-inches wide, with double turned edges, and single lock stitched.
- B. Vertical Seams: Not less than 1/2- inch wide, double turned and double stitched.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of work.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Install tracks level and plumb, according to manufacturer's written instructions.
- B. Up to 20 feet in length, provide track fabricated from one continuous length.
1. Curtain Track Mounting: Surface.
- C. Surface Track Mounting: Fasten surface-mounted tracks at intervals of not less than 24-inches. Fasten support at each splice and tangent point of each corner. Center fasteners in track to ensure unencumbered carrier operation. Attach track to ceiling as follows:
1. Mechanically fasten directly to bottom of steel angle, or as indicated on drawings, with post-installed anchors.
- D. Track Accessories: Install splices, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.
- E. Curtain Carriers: Provide curtain carriers adequate for 18-inch spacing along full length of curtain plus an additional carrier.

- F. Curtains: Hang curtains on each curtain track.

END OF SECTION 102132

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## SECTION 102600 - WALL AND DOOR PROTECTION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Corner guards.

## 1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.
- B. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of impact-resistant wall protection unit indicated.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Corner Guards: 12-inches long.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.
- B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

- B. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
  - 1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
  - 2. Keep plastic sheet material out of direct sunlight.
  - 3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).
    - a. Store corner-guard covers in a vertical position.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F (21 deg C) for not less than 72 hours before beginning installation and for the remainder of the construction period.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Deterioration of plastic and other materials beyond normal use.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; extruded material, thickness as indicated.

1. Impact Resistance: Minimum 25.4 ft-lbf/in. (1356 J/m) of notch when tested according to ASTM D 256, Test Method A.
  2. Self-extinguishing when tested according to ASTM D 635.
  3. Flame-Spread Index: 25 or less.
  4. Smoke-Developed Index: 450 or less.
- B. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less than strength and durability properties specified in ASTM B 221 (ASTM B 221M) for Alloy 6063-T5.
- C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- D. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.2 CORNER GUARDS

- A. Surface-Mounted, Corner Guards: Engineered PETG high-impact corner guard with formed edges; fabricated with 90-degree turn to match wall condition.
1. Basis-of-Design Product: Subject to compliance with requirements, provide "Model SSM-20AN" continuous aluminum retainer corner guard as manufactured by CS Acrovyn or a comparable product by one of the following:
    - a. Balco, Inc.
    - b. IPC Door and Wall Protection Systems; Division of InPro Corporation.
    - c. Korogard Wall Protection Systems; a division of RJF International Corporation.
  2. Wing Size: Nominal 2 by 2- inches.
  3. Thickness: Minimum 0.078-inch.
  4. Mounting: Mechanical fasteners.
  5. Height: Mount from top of base to align with top of door frames 7'-2" total height.
  6. Continuous Retainer: Extruded aluminum retainers 6063-T6 alloy, nominal .062-inch thickness.

## 2.3 FABRICATION

- A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.
- B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

- C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

#### 3.3 INSTALLATION

- A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
  - 1. Install impact-resistant wall protection units at all gypsum board partition wall corners.
  - 2. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
    - a. Provide anchoring devices to withstand imposed loads.

#### 3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

## SECTION 102800 – TOILET AND BATH ACCESSORIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes toilet, shower and custodial accessories.
- B. Related Sections:
  - 1. Section 042200 – “Concrete Unit Masonry” for accessories mounted on CMU walls.
  - 2. Section 092216 – “Non-Structural Metal Framing” for accessories mounted on gypsum board walls.
  - 3. Section 092900 – “Gypsum Board” for accessories mounted on gypsum board walls.
  - 4. Section 102113 - “Toilet Compartments” for accessories mounted on the partitions.
  - 5. Section 102813.63 – “Detention Toilet Accessories” for accessories within the secure housing areas.
  - 6. Section 111901 "Detention Furnishings and Equipment" for accessories designed for installation in detention facilities.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
  - 1. Construction details and dimensions.
  - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
  - 3. Material and finish descriptions.
  - 4. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.
- C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.
- D. Warranty: Sample of special warranty.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

#### 1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

#### 1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Five (5) years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

## 2.2 WASHROOM ACCESSORIES

- A. Basis-of-Design Product: The design for accessories is based on products indicated by Bobrick. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.
4. General Accessory Manufacturing Co. (GAMCO).

- B. Toilet Tissue (Roll) Dispenser Item **TTD**:

1. Basis-of-Design Product: B-2740 as manufactured by Bobrick.
2. Description: Double Roll Toilet Tissue dispenser with cast aluminum body.
3. Mounting: Surface Mounted.
4. Operation: Accommodates two standard-core toilet tissue rolls up to 6-inch diameter. Spindles can be removed with special key furnished.
5. Quantity: One per water closet.

- C. Combination Towel (Folded) Dispenser/Waste Receptacle **PTD**:

1. Basis-of-Design Product: B-3942 as manufactured by Bobrick.
2. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
3. Mounting: Recessed.
4. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels.
5. Minimum Waste-Receptacle Capacity: 12 gal.
6. Material and Finish: Stainless steel, No. 4 finish (satin).
7. Liner: Reusable, vinyl waste-receptacle liner.
8. Lockset: Tumbler type for towel-dispenser compartment.

- D. Liquid-Soap Dispenser **LSD**:

1. Basis-of-Design Product: B-2112 as manufactured by Bobrick.
2. Description: Designed for dispensing soap in liquid or lotion form.
3. Mounting: Horizontally oriented, surface mounted.
4. Capacity: 40 fl oz (2L)
5. Materials: Black molded plastic push button and spout. Soap head-holding mushroom valve. Stainless steel spring. U-packing seal and duckbill.
6. Refill Indicator: Window type.

- E. Sanitary-Napkin Disposal Unit **SND**:

1. Basis-of-Design Product: B-254 as manufactured by Bobrick.
2. Mounting: Surface mounted.

3. Door or Cover: Self-closing disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Capacity: 1.2 gal (4.6 L)
6. Material and Finish: Stainless steel, No. 4 finish (satin).

F. Mirror Unit **MR-1**:

1. Basis-of-Design Product: B-165 2436 as manufactured by Bobrick.  
Frame: Stainless-steel angle, 1/2-inch x 1/2-inch x 3/8-inch channel with 1/4-inch return at rear with bright polished finish.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
  - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
4. Size: 24-inches wide x 36-inches high.
5. Quantity: One above each wall lavatory in Toilet rooms.

G. Robe Hook **RH**:

1. Basis-of-Design Product: B-672 as manufactured by Bobrick.
2. Description: Surface mounted hook unit.
3. Material and Finish: One-piece stainless steel with concealed wall plate.
4. Quantity: One per Toilet room. Location per Architect.

H. Grab Bar **GB-1**: Where this designation is indicated, provide stainless-steel grab bar complying with the following:

1. Products: Provide one of the following:
  - a. Bobrick B-6806 x 36
  - b. Bradley 8120-001-36
  - c. Equal product by one of the other manufacturers listed previously in this section.
2. Stainless-Steel Nominal Thickness: Minimum 18 gage.
3. Mounting: Concealed with manufacturer's standard flanges and anchors
4. Gripping Surfaces: Smooth, satin finish
5. Outside Diameter: 1-1/2 inches for heavy-duty applications.

I. Grab Bar **GB-2**: Where this designation is indicated, provide stainless-steel grab bar complying with the following:

1. Products: Provide one of the following:
  - a. Bobrick B-6806 x 42



- b. Bradley 8120-001-42
    - c. Equal product by one of the other manufacturers listed previously in this section.
  - 2. Stainless-Steel Nominal Thickness: Minimum 18 gage.
  - 3. Mounting: Concealed with manufacturer's standard flanges and anchors
  - 4. Gripping Surfaces: Smooth, satin finish
  - 5. Outside Diameter: 1-1/2 inches for heavy-duty applications.
- J. Grab Bar **GB-3**: Where this designation is indicated, provide stainless-steel grab bar complying with the following:
- 1. Products: Provide one of the following:
    - a. Bobrick B-6806 x 18
    - b. Bradley 8120-001-18
    - c. Equal product by one of the other manufacturers listed previously in this section.
  - 2. Stainless-Steel Nominal Thickness: Minimum 18 gage.
  - 3. Mounting: Concealed with manufacturer's standard flanges and anchors
  - 4. Gripping Surfaces: Smooth, satin finish
  - 5. Outside Diameter: 1-1/2-inches for heavy-duty applications.
- K. Diaper-Changing Station **DCS**:
- 1. Products: Provide one of the following:
    - a. Bobrick KB200-SS
    - b. Bradley Model 961 with stainless steel front.
    - c. Equal product by one of the other manufacturers listed previously in this section.
  - 2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
    - a. Engineered to support a minimum of 250-lb (113-kg) static load when opened.
  - 3. Mounting: Surface mounted, with unit projecting not more than 4-inches from wall when closed.
  - 4. Operation: By pneumatic shock-absorbing mechanism.
  - 5. Material and Finish: HDPE (high density polypropylene) in manufacturer's standard color.
  - 6. Liner Dispenser: Built in.
  - 7. One at each Toilet room located off Main Lobby.
- L. Shower Curtain Rod with Curtain **SCR**:
- 1. Basis-of-Design Product: Bobrick B-6107x36.
  - 2. Outside Diameter: 1-inch.
  - 3. Mounting: Flanges with exposed fasteners.
  - 4. Rod Material and Finish: Stainless steel, No. 4 finish (satin).

5. Flange Material and Finish: Stainless steel, No. 4 finish (satin).
6. Accessories: Integral chrome-plated brass glide hooks.
7. Curtain: Bobrick B-204-2; Width: 42-inches; Height: 72-inches.
8. Shower Curtain Hooks: (7 hooks) Bobrick B-204-1.

M. Folding Shower Seats (**FSS**):

1. Basis-of-Design Product: Bobrick B-5181.
2. Seat: One-piece, 1/2-inch thick solid phenolic.
3. Frame: Type 304 stainless-steel; 16 gage 1-1/4-inch square tubing and 18 gage diameter seamless tubing.
4. Mounting Flanges: 3-inch diameter type 304 stainless-steel.
5. Baseplate: Type 304 heavy gage stainless steel.

N. Mop and Broom Holder with Utility Self: (**US**)

1. Basis-of-Design Product: Subject to compliance with requirements provide "Model B-239" as manufactured by Bobrick Washroom Equipment, Inc., or comparable product by one of the following:
  - a. American Specialties, Inc.
  - b. Bradley Corporation.
2. Description: Unit with shelf, hooks and holders.
3. Length: 34-inches.
4. Hooks: Four (4).
5. Mop/Broom Holders: Three (3), spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless-steel, No. 4 finish (satin).
  - a. Shelf: Not less than nominal 0.05-inch thick stainless-steel.
  - b. Rod: Approximately 1/4-inch-diameter stainless-steel.

O. Surface-Mounted Automatic Hand Dryer: (**WAD**)

1. Basis-of-Design Product: Subject to compliance with requirements provide Xlerator "Model XL-BW" automatic hand dryer as manufactured by Excel Dryer, Inc. or comparable product by one of the following:
  - a. American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc.
  - c. Bradley Corporation.
2. Description: One-piece, deep drawn hand dryer unit.
3. Cover: Thermoset Resin.
4. Operation: Electronic sensor.
5. Electrical Requirements: 110-120V 50/60 Hz.
6. Size: 11-3/4-inches wide x 12-11/16-inches high x 6-11/16-inches deep.

P. Surface-Mounted Shower Shelf: **(SS)**

1. Basis-of-Design Product: Subject to compliance with requirements provide "Model B-295-16" as manufactured by Bobrick or a comparable product by one of the following:
  - a. American Specialties, Inc.
  - b. Bradley Corporation
2. Description: Surface mounted shelf unit.
3. Material and Finish: One-piece stainless steel.
4. Size: 16-inches by 5-inches.
5. Quantity: One per staff shower.

2.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

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## SECTION 102813.63 - DETENTION TOILET 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. Safety hooks.
2. Shower curtain.
3. Miscellaneous toilet accessories.
4. Mirrors.
5. Grab bars.
6. Shower seats.

- B. Related Requirements:

1. Section 042200 - "Concrete Unit Masonry" for accessories mounted to in-place CMU wall.
2. 050553 - "Section Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment, accessories and fixtures within the secure perimeter.
3. Section 102800 "Toilet, Bath, and Laundry Accessories" for non-detention toilet accessories.
4. Section 135500 - "Prefabricated Modular Steel Cells" for detention toilet accessories provided with the modular cells.

## 1.3 COORDINATION

- A. Coordinate installation of anchorages for detention toilet accessories. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjoining construction. Deliver such items to Project site in time for installation.
- B. Coordinate size and location of recesses in wall construction to receive recessed detention toilet accessories.

## 1.4 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: For each type of detention toilet accessory indicated.
  1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: For detention toilet accessories. Indicate types, quantities, sizes, and installation locations by room of each accessory required. Use same designations indicated on Drawings.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Examination reports documenting inspection of substrates, areas, and conditions.
- B. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
- C. Field quality-control certification signed by Detention Equipment Contractor (DEC).

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For detention toilet accessories to include in maintenance manuals.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Security Fasteners: Furnish not less than 1 box for each 50 boxes or fraction thereof, of each type and size of security fastener installed.
  2. Tools: Provide two sets of tools for installing and removing security fasteners.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace detention toilet accessories that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including deflection exceeding 1/4-inch.
    - b. Faulty operation of hardware.
    - c. Deterioration of metals, metal finishes, and other materials.
  2. Warranty Period: Two (2) years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 DETENTION SAFETY HOOKS

- A. Individual, Straight, Detention Safety Hook (**DSH**): One-piece stainless-steel formed and grounded smooth safety hook with stainless-steel ball and frame.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Safety Hook, "Model ITH-110" or a comparable product by one of the following:
    - a. American Specialties, Inc.
    - b. Bobrick Washroom Equipment, Inc.
    - c. Willoughby Industries.
  - 2. Mounting: Front mounting with security fasteners.
- B. Materials:
  - 1. 14 gage type 304 stainless-Steel.
- C. Stainless-Steel Finish:
  - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
  - 2. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - a. Run grain of directional finishes with long dimension of each piece.
    - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    - c. Directional Satin Finish: No. 4.

## 2.2 DETENTION TOILET TISSUE DISPENSER

- A. Recessed, Detention Toilet Tissue Dispenser (**DTTD**): Minimum 5-inch diameter by 4-inches deep; formed from 16 gage thick, stainless-steel sheet welded to 14 gage flange.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Toilet Paper Holder, "Model ITP-110" (front mount) and "Model 100" (chase mount) or a comparable product by one of the following:
    - a. American Specialties, Inc.
    - b. Bobrick Washroom Equipment, Inc.
    - c. PSI LLC.
    - d. Willoughby Industries.
  - 2. Face: 7-inch-square face flange.

## 3. Mounting:

- a. Front mounting with security fasteners.
- b. Chase mounting anchor nuts to receive threaded rods with 11 gage back plate.

## B. Materials:

1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.

## C. Stainless-Steel Finish:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
  - a. Run grain of directional finishes with long dimension of each piece.
  - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
  - c. Directional Satin Finish: No. 4.

## 2.3 DETENTION MIRRORS

A. One-Piece Stamped with Raised Frame Detention Mirror (**DM**): Mirror formed from 18 gage type 430 stainless-steel sheet with round corners.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Wall Mirror, Model No. MFSST-REC-1620 or a comparable product by one of the following:
  - a. American Specialties, Inc.
  - b. Bobrick Washroom Equipment, Inc.
  - c. Cortech USA.
  - d. PSI LLC.
  - e. Willoughby Industries.
2. Overall Size: 11-1/4-inches wide x 17-1/4-inches high.
3. Mirror Size: 9-1/4-inches wide x 15-1/4-inches high.
4. Finish:
  - a. Highly polished No. 8 stainless-steel.

## 2.4 DETENTION GRAB BARS

## A. Grab Bars: 1-1/2 inches in diameter; formed from 0.050-inch-thick, stainless-steel tubing, with 3-inch-diameter flanges formed from 0.125-inch-thick, stainless steel. Closure plates formed from 0.125-inch-thick, stainless steel. All-welded construction.



1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Security Grab Bar, IGS Series or a comparable product by one of the following:
  - a. American Specialties, Inc.
  - b. PSI LLC.
  - c. Willoughby Industries.
2. Length:
  - a. **DGB-1:** 42-inches long.
  - b. **DGB-2:** 36-inches long.
  - c. **DGB-3:** 18-inches long (vertical).
  - d. **DGB-4:** "L" -shaped 18-inches by 32-inches (shower).
3. Mounting: Front mounting with security fasteners.

B. Materials:

1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
2. Stainless-Steel Tubing: ASTM A 1016 /A 1016M-08, austenitic stainless steel, Type 304, seamless.

C. Stainless-Steel Finish:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
  - a. Run grain of directional finishes with long dimension of each piece.
  - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
  - c. Directional Satin Finish: No. 4.

2.5 DETENTION SHOWER SEATS

- A. Recessed Shower Seats (**DSS**): Double-pan retractable, recessed L-shape shower seat. Approximately 34-inch wide by 28-inch high by 3-5/8-inch deep formed from 0.062-inch (16 gage) thick, stainless-steel sheet. Seat pivots on solid 0.500-inch-diameter stainless-steel rod and self-latches when closed. Minimum 750-lb. loading capacity. Back cover formed from 0.038-inch (20 gage) stainless steel. C-channels formed from 0.125-inch (11 gage) stainless steel.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Recessed Shower Seat, Model No. ISS-220 or a comparable product by one of the following:

- B. Lock: Provide stainless steel padlock hasp or locking mechanism to lock the seat in the closed position.
- C. Materials:
  - 1. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless steel, Type 304.
- D. Stainless-Steel Finish:
  - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
  - 2. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - a. Run grain of directional finishes with long dimension of each piece.
    - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    - c. Directional Satin Finish: No. 4.

## 2.6 SECURE SHOWER CURTAIN SYSTEM:

- A. Secure Shower Curtain System: **(DSC)**: Description: Heavy-duty, anti-bacterial/anti-fungal vinyl shower curtain with releasable curtain tabs and track.
  - 1. Basis-of-Design: Imperial Fastener Company
  - 2. Installer shall provide field measuring for final verification of dimensions of all components at each location.
  - 3. Curtain shall be Sure-Chek by Imperial Fastener: Flame resistant, Anti-bacterial, Anti-fungal, Self Deodorizing and Mildew resistant. Top of curtain shall be durable vinyl-coated mesh. Clear portion of curtain shall be clear vinyl. Privacy portion of the curtain shall be reinforced with polyester scrim.
  - 4. Curtain Track:
    - a. Material: Heavy-duty anodized aluminum.

## 2.7 FABRICATION

- A. Coordinate dimensions and attachment methods of detention toilet accessories with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Form edges and corners to be free of sharp edges and rough areas. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch-wide hem on the concealed side, or ease edges to a radius of approximately 1/32-inch and support with concealed stiffeners.

- D. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Weld corners and seams continuously to comply with referenced AWS standard and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  - 5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention toilet accessories rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.
- G. Cut, reinforce, drill, and tap detention toilet accessories to receive hardware, security fasteners, and similar items.
- H. Form exposed work true to line and level with accurate angles and surfaces. Grind off and ease edges unless otherwise indicated.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security fasteners. Locate joints where least conspicuous.

## 2.8 SECURITY FASTENERS

- A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific type of fastener. Drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:
  - 1. Drive-System Type: Pinned Torx.
  - 2. Fastener Strength: 120,000 psi.
  - 3. Socket Button Head Fasteners:
    - a. Stainless steel, ASTM F 879, Group 1 CW.
  - 4. Socket Flat Countersunk Head Fasteners:
    - a. Stainless steel, ASTM F 879, Group 1 CW.

- 5. Socket Head Cap Fasteners:
  - a. Stainless steel, ASTM F 837, Group 1 CW.

## 2.9 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Built-in Masonry Anchors: Fabricated from 0.078-inch nominal-thickness steel sheet into concrete masonry units.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention toilet accessories.
  - 1. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention toilet accessory connections before detention toilet accessory installation.
  - 2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention toilet accessories.
- B. Inspect built-in and cast-in anchor installations before installing detention toilet accessories to verify that anchor installations comply with requirements. Prepare inspection reports.
  - 1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
  - 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- C. Verify locations of detention toilet accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention toilet accessories to in-place construction. Include threaded fasteners for concrete and masonry inserts, security fasteners, and other connectors.
- B. Provide temporary bracing or anchors in formwork for items that are to be built into concrete and masonry or similar construction.

- C. Apply security sealant around perimeter in a continuous ribbon on back of detention toilet accessories before installation.
- D. Security Fasteners: Install detention toilet accessories using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel security fasteners in stainless-steel materials.

### 3.3 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Remove and replace detention work where inspections indicate that work does not comply with specified requirements.
- C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- D. Prepare field quality-control certification endorsed by Detention Equipment Contractor that states installed products and their installation comply with requirements in the Contract Documents.

### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary labels and protective coatings.
- B. Adjust safety hooks to release with application of 8-lbf load.
- C. Touchup Painting: Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 102813.63

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## SECTION 104413 - FIRE EXTINGUISHER CABINETS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Fire protection cabinets for the following:
    - a. Portable fire extinguishers.
- B. Related Sections:
  - 1. Section 042200 – “Concrete Unit Masonry” for cabinets mounted in CMU walls.
  - 2. Section 092216 - “Non-Structural Metal Framing” for cabinets mounted within this wall type framing.
  - 3. Section 092900 - “Gypsum Board” for cabinets mounted within this wall type.
  - 4. Section 104416 - "Fire Extinguishers" for fire extinguishers located within the cabinets.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
  - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function.

## 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

## 1.5 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

### 2.2 RATED AND NON-RATED FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Architectural Series 2409-6R Non Rated" and "FS2409RA-HD Flame Shield Fire Rated" cabinet as manufactured by Larsen's Manufacturing Company or comparable product by one of the following:
    - a. J. L. Industries, Inc., a division of Activar Construction Products Group
    - b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc
    - c. Potter Roemer LLC
- B. Cabinet Construction: Nonrated in non-rated walls; Rated in fire-rated walls.
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch thick cold-rolled steel sheet lined with minimum 5/8-inch thick fire-barrier material. Provide factory-drilled mounting holes. Fire rating must match wall fire rating.
- C. Cabinet Material: 0.097-inch thick steel sheet.
- D. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.
  - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Cabinet Trim Material: Same material and finish as door.
- F. Door Material: 0.097-inch thick steel sheet.



- G. Door Style: Solid opaque panel with frame.
- H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 1. Provide projecting door pull and friction latch.
  - 2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- I. Accessories:
  - 1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
    - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Pressure-sensitive vinyl letters.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.
- J. Finishes:
  - 1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
  - 2. Manufacturer's standard baked-enamel or powder coat paint for the following:
    - a. Exterior of cabinet, door, and trim except for those surfaces indicated to receive another finish.
    - b. Interior of cabinet and door.

## 2.3 RATED AND NON RATED SECURITY FIRE-PROTECTION CABINET

- A. Cabinet Type: Semi-recessed, tamper-resistant, suitable for fire extinguisher located within the secured perimeter.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide "Model FS DECS-2409-R4 Fire-Rated" and "DECS-2409-R4 Non-Rated" detention type fire extinguisher cabinets as manufactured by Larsen's Manufacturing Company or comparable product by one of the following:
    - a. Babcock-Davis.
    - b. Guardian Fire Equipment, Inc.
    - c. JL Industries, Inc.; a division of the Activar Construction Products Group.
    - d. Nystrom, Inc.
    - e. Potter Roemer LLC.

- B. Cabinet Construction: Nonrated in non-rated walls; Rated in fire-rated walls.
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls lined with minimum 5/8-inch thick fire-barrier material.
- C. Cabinet Material: 0.097-inch thick steel sheet.
  - 1. Shelf: Same metal and finish as cabinet.
- D. Semi-recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: 0.097-inch thick steel sheet.
- H. Door Style: Solid door with frame.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated, and as follows:
  - 1. Recessed door pull.
  - 2. Continuous Hinge: Same material and finish as trim, permitting door to open 180 degrees.
  - 3. Mechanical Deadlock: Model HSL H II deadlock and Model HSL III latch as manufactured by Larsen's Manufacturing Company or comparable product by one of the cabinet manufacturers listed.
- J. Accessories:
  - 1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
    - a. Identify fire extinguisher in security fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Pressure-sensitive vinyl letters.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.
  - 2. Keys: Two per door lock. All cabinets keyed the same.
- K. Finishes:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
2. Manufacturer's standard baked-enamel or powder coat paint for the following:
  - a. Exterior of cabinet, door, and trim except for those surfaces indicated to receive another finish.
  - b. Interior of cabinet and door.

## 2.4 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth.
  2. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2- inch thick.
  2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.6 STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pre-treating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

#### 3.3 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:
  1. Fire Protection Cabinets: 54 inches above finished floor to top of cabinet.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
  1. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
- C. Identification: Apply vinyl lettering at locations indicated.

#### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

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## SECTION 104416 - FIRE EXTINGUISHERS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Sections:
  - 1. Section 104416 - "Fire Extinguisher Cabinets."

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

## 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

## 1.6 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FMG.

## 1.7 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.
  2. Warranty Period: Five years (5) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - c. Larsen's Manufacturing Company.
    - d. Potter Roemer LLC.
  2. Valves: Manufacturer's standard.
  3. Handles and Levers: Manufacturer's standard.
  4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- B. Multi-Purpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with mono-ammonium phosphate-based dry chemical in enameled-steel container.



- C. For Kitchen areas, provide extinguishers rated for Class K fires. Class K fires occur “in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).”
  - 1. Provide Larsen Model WC2-1/2 or equal product by one of the other listed manufacturers. This unit is 7-inches in diameter x 24-1/2-inches tall, weighs 34 pounds and has 2-1/2 gallon capacity.

## 2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - c. Larsen's Manufacturing Company.
    - d. Potter Roemer LLC.
- B. Location: Refer to drawings.
  - 1. All other locations are Fire Extinguisher Cabinets, unless noted otherwise.
- C. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Horizontal.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mounting Brackets: 48-inches above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

## SECTION 105113 - METAL LOCKERS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes:
  - 1. All welded, heavy-duty metal lockers.
- B. Related Requirements:
  - 1. Section 033000 - "Cast-In-Place Concrete" for the cast-in-place concrete a locker base.
  - 2. Section 042200 - "Concrete Unit Masonry" for locker attachment to this wall type.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locker trim and accessories.
  - 2. Include locker identification system and numbering sequence.
- C. Samples: Manufacturer standard colors.
- D. Qualification Data: For qualified Installer.
- E. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.
- F. Warranty: Sample of special warranty.

## 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

- B. Source Limitations: Obtain metal lockers and accessories from single source from single manufacturer.
- C. Regulatory Requirements: Where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA).
- D. Pre-installation Conference: Conduct conference at Project site.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

#### 1.5 PROJECT CONDITIONS

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

#### 1.6 COORDINATION

- A. Coordinate sizes and locations of concrete base for metal lockers and coordinate locker installation on concrete benches.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
  - 1. Failures include, but are not limited to, structural failures and faulty operation of latches and other door hardware.
  - 2. Damage from deliberate destruction and vandalism is excluded.
  - 3. Warranty Period for All-Welded Metal Lockers: Ten (10) years from date of Substantial Completion.

#### 1.8 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Metal locker hooks equal to 5 percent of amount installed for each type and finish installed, but no fewer than 10.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- C. Anchors: Material, type, and size required for secure anchorage to each substrate.
  1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts for corrosion resistance.
  2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

### 2.2 HEAVY-DUTY METAL LOCKERS

- A. Products: Subject to compliance with requirements, provide one of the following:
  1. DeBourgh Mfg. Co.; Sentry Corridor/Personnel Lockers.
  2. List Industries Inc.; Marquis Protector.
  3. Lyon Workspace Products, LLC; All-Welded Lockers.
  4. Penco Products, Inc.; All-Welded Lockers.
  5. Republic Storage Systems company, Inc.
- B. Single-Tier Locker Unit Size: **(Type 1)**.
  1. Locker Width: 12-inches.
  2. Locker Depth: 12-inches.
  3. Locker Height: 72-inches.
  4. Overall Unit Height: 72-inches.
  5. Locker Base: 4-inch concrete.
  6. Location: Refer to drawings.
- C. Double-Tier Locker Unit Size: **(Type 2)**.
  1. Locker Width: 12-inches.
  2. Locker Depth: 12-inches.
  3. Locker Height: 36-inches.
  4. Overall Unit Height: 72-inches.
  5. Locker Base: 4-inch concrete.
  6. Location: Refer to drawings.

- D. Six-Tier Locker Unit Size: **(Type 3)**.
1. Locker Width: 12-inches.
  2. Locker Depth: 12-inches.
  3. Locker Height: 12-inches.
  4. Overall Unit Height: 72-inches.
  5. Locker Base: 4-inch concrete.
  6. Location: Refer to drawings.
- E. Material: Cold-rolled steel sheet.
- F. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
1. Tops, Bottoms, and Sides: 0.060-inch nominal thickness.
  2. Backs: 0.048-inch nominal thickness.
  3. Shelves: 0.060-inch nominal thickness, with double bend at front and single bend at sides and back.
- G. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.
1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- H. Doors: One piece; fabricated from 0.075-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
1. Door Style:
    - a. Louvered Vents: No fewer than three louver openings at top and bottom for double-tier lockers.
    - b. Security Vents: Manufacturer's standard, stamped horizontal or vertical.
- I. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Knuckle Hinges: Steel, full loop, five or seven knuckles, tight pin; minimum 2-inches high. Provide no fewer than three hinges for each door more than 42-inches high.
  2. Continuous Hinges: Manufacturer's standard, steel, full height.
- J. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry and vandal resistant.
1. Single-Point Latching: Nonmoving latch hook with steel padlock loop that projects through recessed cup and is finished to match metal locker body.

- a. Latch Hook: Equip each door with one latch hook, fabricated from 0.120-inch nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.
  - K. Combination Padlocks: Provided by Owner.
  - L. Cylinder Locks: Visitor Lockers located off Waiting B1002 will be keyed cylinder locks. Provide five (5) keys per locker to be kept at Master Control.
  - M. Equipment: Equip each metal locker with identification plate and the following unless otherwise indicated:
    - 1. Single and Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
    - 2. Hooks shall have a minimum 20 lb. capacity.
  - N. Accessories:
    - 1. Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
      - a. Closures: Vertical end type.
    - 2. Recess Trim: Fabricated from 0.048 inch-nominal-thickness steel sheet.
    - 3. Filler Panels: Fabricated from 0.048 inch-nominal-thickness steel sheet.
    - 4. Boxed End Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.
  - O. Finish: Baked enamel.
    - 1. Color(s): As selected by Architect from manufacturer's full range.
- 2.3 BENCHES:
- A. Bench Tops:
    - 1. Material: Laminated Harwood with rounded corners.
    - 2. Thickness: 1-1/4-inches.
    - 3. Width: 10-inches.
    - 4. Lengths: 30-inches.
  - B. Bench Pedestals:
    - 1. Material: Steel Tubing with 10 gage steel flanges.
    - 2. Height: 16-1/4-inches.
    - 3. Finish: Match lockers.

## 2.3 MATERIALS:

- A. Cold-rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Fasteners: Zinc-or-nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- C. Anchors: Material, type, and size required for secure anchorage to each substrate.
  - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts for corrosion resistance.
  - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- D. Finish: Textured (Standard).
  - 1. Powder Coat: Provide factory applied electrostatic powder coat paint. Meet or exceed specifications of the ASTM Standards.
  - 2. Color: As selected by Architect from manufacturer's full range.

## 2.4 FABRICATION

- A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
  - 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
  - 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
- C. All-Welded Construction: Factory pre-assemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory-weld main locker groups into one-piece structures. Grind exposed welds flush.
- D. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
- E. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8-inch high. Each room will have a separate numbering system such as A1 thru A80, B1 thru B20, C1 thru C20, etc. Exact numbering to be finalized by Architect.
- F. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.



1. Sloping-top corner fillers, mitered.

- G. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.
- H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel. Provide filler panel over columns.
- I. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of non-recessed metal lockers; finished to match lockers.
- J. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

## 2.5 STEEL SHEET FINISHES

- A. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.
- B. Baked-Enamel Finish: Immediately after cleaning, pre-treating, and phosphatizing, apply manufacturer's standard thermosetting baked-enamel finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls, floors, concrete benches and concrete bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
  - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36-inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
  - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
  - 3. Anchor back-to-back metal lockers to concrete base/floor.

- B. All-Welded Metal Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
  - 1. Attach hooks with at least two fasteners.
  - 2. Attach door locks on doors using security-type fasteners.
  - 3. Identification Plates: Identify metal lockers with identification.
    - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
  - 4. Attach recess trim to recessed metal lockers with concealed clips.
  - 5. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings or as required.
  - 6. Attach sloping-top units to metal lockers, with closures at exposed ends.
  - 7. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of non-recessed metal lockers.

### 3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.
- B. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- C. Touch up marred finishes or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

## SECTION 105114 - EVIDENCE LOCKERS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes evidence lockers and refrigerated evidence lockers.
- B. Section includes evidence drying cabinets.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of locker.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker.
- B. Shop Drawings: For metal lockers.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Show locker trim and accessories.
  - 3. Include locker identification system and numbering sequence.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for their installation.

## 1.7 FIELD CONDITIONS

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

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Faulty operation of latches and other door hardware.
  - 2. Damage from deliberate destruction and vandalism is excluded.
  - 3. Warranty Period for Lockers: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 EVIDENCE LOCKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide DSM Keyless Evidence Locker, as manufactured by Spacesaver Corporation, 1450 Janesville Avenue, Fort Atkinson, WI 53538-2798
  - 1. Other manufacturers:
    - a. DeBourgh Keyless Evidence Lockers
    - b. Tiffin Metal Products.
- B. Locker Construction:
  - 1. Locker Size: As indicated on the Drawings.
  - 2. Construct all exterior components of 16-gage cold rolled steel except base.
  - 3. Provide base of 14-gage steel. Provide inner skins of 18-gage steel.
  - 4. Welding: Use "resistance" or "MIG" welding where appropriate. All exposed corners shall be welded solid and smoothed prior to finishing. The base shall be fully welded to the cabinet to create a solid structure.
  - 5. Base with toe space.
  - 6. Lockers shall be modular and shipped as a fully assembled unit.

7. Provide adjustable floor levelers.
8. Hinges: Provide heavy-duty continuous stainless-steel hinges secured with welds to each door frame and to door. The space between welds shall not exceed 3-inches. Hinges shall have non-removable pins.
9. Locker Doors: One-piece, 16-gage (0.0625-inch) cold rolled steel. All exposed corners shall be welded solid and smoothed prior to finishing. Provide 18-gage interior door skins for additional rigidity and to conceal the mechanical elements of the door. Provide spot-welded reinforcement along the length as required. Doors shall be provided with self-closing devices.
  - a. Door Handles: Front door handles shall be chrome and recessed.
  - b. Locking Device: Standard keyless (push button) locks on all front doors.
  - c. Provide locker doors on the front and back of the unit, similar, but mirror image.
10. Accessories: Provide neoprene silencers. Provide riveted number tags and instruction tags on doors
11. Materials:
  - a. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 (ZF180) zinc-iron, alloy (galvannealed) coating designation.
12. Finish: All surfaces shall first be smoothed and polished, then phosphate-treated. Provide a baked enamel or powder coat finish.
  - a. Color: As selected by Architect from manufacturer's full range.

## 2.2 EVIDENCE DRYING CABINETS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Model No. DC-1" blood drying cabinet as manufactured by DSM Law Enforcement Products or a comparable product by one of the following:
  1. Other manufacturers:
    - a. DeBourgh Keyless Evidence Lockers
    - b. Tiffin Metal Products.
- B. Cabinet Construction:
  1. Cabinet Size: As indicated on the Drawings.
  2. Material: 304 and 430 Stainless-steel exterior and interior ASTM A240.
  3. Finish: No. 4.
  4. Hinges and Fasteners: Heavy-duty stainless-steel hinges and fasteners.
  5. Doors: Louvered door vents with magnetic seal.
  6. Interior: Insulated double-wall stainless-steel wall with curved corners with stainless-steel components.
  7. Replaceable air filter.

8. Adjustable floor levels.
9. Base: 14 gage stainless-steel sheet.
10. Body: 16 gage stainless-steel sheet.
11. Size: Refer to drawings.
12. Locking Device: Combination lock.
13. Drainage: Drainage pipe with shut-off valve.
14. Accessories: Removable hanger rod and three (3) adjustable shelves.

C. HVAC Considerations.

1. Static pressure drop is 1" @ 400CFM across the cabinet.
2. The outlet at the top of the cabinet is 8-inch inner diameter.
3. The filter in the door is a 20-inch x 20-inch micro sponge with a rating of 97% efficiency. The louvered door has (95) 3-inch x 5/16-inch louvers.
4. The filter over the outlet (inside the cabinet) is 14-inches x 14-inches with a rating of 97% efficiency. The filter cage has (150) 3/8-inch x 2-inch oblong holes.
5. Manufacturer recommends an exhaust fan that will draw between 300 and 450 CFM maximum. An on/off exhaust fan power switch should be installed adjacent to the unit for ease of operation.
6. Manufacturer recommends that the fan be a type that can be adjusted after the customer has started using the unit. This can be accomplished either by changing pulley size or motor speed. Drying various articles does not require infinite adjustment for individual drying processes however, the ability to fine-tune the system after installation is a big advantage.
7. The drain in the bottom of the unit can be connected to city sewage if local regulations permit. In this case a self-priming "P" trap should be used. Alternately, a stainless-steel pail can be used to gather material from the unit.

D. Warranty: Five (5) years from date of Substantial Completion.

## 2.3 FABRICATION

- A. Fabricate metal lockers and cabinets square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
  2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.

## 2.4 ACCESSORIES

- A. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine walls and floors with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Welded Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.
- B. Equipment:
  1. Identification Plates: Identify metal lockers with identification indicated on Drawings.
    - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
    - b. Attach plates to upper shelf of each open-front metal locker, centered, with at least two aluminum rivets.
- C. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
  1. Attach recess trim to recessed metal lockers with concealed clips.
  2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.

#### 3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

#### 3.4 PROTECTION

- A. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

- B. Touch up marred finishes, or replace lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105114



## SECTION 105626 – MOBILE STORAGE SHELVING

## 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. Mechanically assisted, carriage-mounted, high density mobile storage systems, including support rails, fabrication including leveling of support rails.
- B. Related Work, Not Furnished:
  - 1. Finish floor covering materials and installation on concrete with recessed rail installation.
- C. Related Requirements:
  - 1. Section 033000 - "Cast-In-Place Concrete".
    - a. Base floor capable of withstanding line load weight distribution created by load transfers from weight of system, storage housing, media and occupants.
    - b. Finished floor material and installation within system footprint.
  - 2. Sections in Division 9 – Finishes, relating to finish floor and base materials.

## 1.3 REFERENCES

- A. American National Standards Institute (ANSI) Standards:
  - 1. Applicable standards for fasteners used for assembly.
- B. America Society of Testing and Materials (ASTM) Standards:
  - 1. Applicable standards for steel materials used for fabrication.
- C. American Institute of Steel Construction (AISC) Standards:
  - 1. Applicable standards for steel materials used for fabrication.

#### 1.4 SYSTEMS DESCRIPTION

- A. General: The system consists of manufactured storage units mounted on manufacturer's track-guided carriages to form a compact storage system. System design permits access to any single aisle by manually moving units until the desired aisle is opened. The carriage/rail system provides uniform carriage movement along the total length of travel, even with unbalanced loads.
- B. Carriage System Design and Features: The welded carriage system with .75" recess consists of a formed structural steel frame with machined and balanced wheels riding on steel rails recessed mounted to the floor. Rails shall be types selected by the manufacturer to ensure smooth operation and self-centering of mobile storage units during travel without end play or binding. Rail types, quantities and spacing shall be selected by the manufacturer to suit installation conditions and requirements. All bearings used in the drive mechanism shall be permanently shielded and lubricated. Bolted carriages are unacceptable.
- C. Movement Controls: Triple arm operating wheels with rotating hand knobs shall be provided on the accessible (drive) ends of shelf units, centered on the end panel, located 40-inches from the base of each unit to permit units to be moved to create a single aisle opening. Turning the handle transmits power through chain drive to drive wheels on each carriage.
- D. Drive System: The system shall be designed with a positive type mechanically-assisted drive which minimizes end play, ensures there is no play in the drive handle, and that carriages will stop without drifting.
  - 1. System shall include a chain sprocket drive system for each movable carriage to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads. All system components shall be selected to ensure a smooth, even movement along the entire carriage length. Drive system gearing shall be designed to permit 1 lb. of force applied to the drive handle to move a minimum of 4,000 lbs. of load.
  - 2. A chain tensioning device shall be provided on each chain drive with provision for adjusting tension without removing end panels.
  - 3. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
- E. Safety Features:
  - 1. Color-coded visual indicators shall provide verification that carriages are in a locked or unlocked mode.
  - 2. A single safety lock button, mounted on each operating wheel hub, will permit moving a carriage in either direction to create a new access aisle when pulled out (unlocked), or locking the carriage when pushed in.
  - 3. Mechanical Sweep and Safety Stop (Non-Powered).

Every potential aisle shall be protected with a 3" high extruded aluminum safety sweep, hinged from the carriage using spring steel leaf springs, with the base edge maximum 3/4" from the floor. The carriage(s) shall stop when depressed at any location along the leading edge of the sweep surface. Activated safety sweep shall engage an impact- absorbing friction disk brake to protect occupants, stored media and the carriage system itself via a sheathed cable system comprised of aircraft-grade 3/64" stainless steel core cables housed inside lined conduit. Safety sweep shall have bright, red and white safety identification tape applied full length marking its location. Safety sweep shall run the full length of both sides of each moveable carriage for full aisle coverage.

Mechanical safety sweep shall automatically reset to enable mobile system users to freely and safely back carriages away from aisle obstructions simply by reversing the direction of the rotating handle.

Safety sweep shall be operational when the carriages are not moving. Should a sweep be activated in an open aisle, the carriage with the activated sweep will not close on that aisle. Safety sweep shall automatically reset if activated and then released when the carriages are not moving.

Safety sweep shall require no electrical power or batteries to operate.

F. Finishes:

1. Fabricated Metal Components and Assemblies: Manufacturer's standard powder coat paint finish.
2. End Panels, Accessible Ends: Plastic laminate, manufacturer's standard textures and patterns.

1.5. PERFORMANCE REQUIREMENTS

A. Ease of Movement: Provide mechanically assisted units capable of being moved by exerting a maximum horizontal force of 5 pounds on the operating wheel.

B. Seismic Performance:

1. Mobile shelving systems shall withstand the effects of earthquake motions determined according to ASCE/SEI7.
2. Structural Performance:
  - a. Load per Linear Foot of Carriage and Rail: 1000 lb/ft.
  - b. Rail Deflection: Maximum not to exceed L/480.

C. Ease of Movement:

1. For manually operated systems, maximum 1 lbf required to move 1000 lbs.

D. Design Requirements:

1. Limit overall height to 97-inches.
2. Limit overall length to 218-inches.

#### 1.6 COORDINATION

- A. Recessed Tracks: Coordinate size and location of recesses in concrete with installation of recessed tracks.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for mobile shelving systems and accessories. This all must be verified prior to the installation of the concrete floor slab.

#### 1.7 ACTION SUBMITTALS

- A. Shop Drawings:

1. Include plans, elevations, sections, and details.
2. Show shelving layout.
3. Show location and extent of rail system.
4. Show clear-aisle widths from face of carriages.
5. Detail fabrication and installation of mobile shelving systems including methods of anchoring shelves and rails to building structure as required for seismic restraint.

- B. Samples:

1. For each exposed product and for each color and texture specified, 6-inches in size.

- C. Samples for Initial Selections:

1. For units with factory-applied finishes, 6-inches in size.

#### 1.8 INFORMATIONAL SUBMITTALS:

- A. Qualification Data:

1. For Installer.

- B. Sample Warranty:

1. For manufacturer's special warranty.

#### 1.9 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mobile shelving systems to include in maintenance manuals.

#### 1.10 MAINTENANCE MATERIALS SUBMITTALS

- A. Furnish extra materials that match products installed and that are packages with protective covering for storage and identified with labels describing contents.

- 1. Shelf Units: Five (5) of each size and type indicated.

#### 1.11 QUALITY ASSURANCE

- A. Installer Qualifications:

- 1. Installer Qualifications: An entity that employs and supervisors who are trained and approved by manufacturer. Engage an experienced installer who is authorized by the manufacturer to install a high-density mobile system of this magnitude and has a minimum of 1-year experience doing so.

- B. Manufacturer Qualifications:

- 1. Engage an experienced manufacturer who has been continuously manufacturing this type of product without interruption for a minimum of twenty (20)-years and can supply a list of references upon request.
    - a. Manufacturer must have a minimum of ten (10)-years experience in the manufacture of mechanically operated mobile storage systems.

#### 1.12 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions before fabrication. Indicate verified measurements on Shop Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating mobile storage units without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

#### 1.13 SEQUENCING AND SCHEDULING

- A. Coordinate the recessed steel rail locations, dimensions and details for the mobile storage units prior to the installation of the concrete floor slab in this area.
- B. Sequence high-density mobile storage system with adjoining work to minimize possibility of damage and soiling during entire construction period.
- C. Schedule installation of specified high-density mobile system after finishing operations, including painting have been completed.

- D. Delivery, Storage, and Handling:
  - 1. Comply with all instructions and recommendations made by manufacturer or manufacturer's representative for delivery, storage and handling requirements.
- E. Pre-installation Conference: Schedule and conduct conference on project site to review methods, procedures, and logistic details for coordination of installation of high-density mobile system.
  - 1. Recommend attendees:
    - a. Owner's representative.
    - b. Construction Manager or representatives.
    - c. Architect, engineer or person responsible for the layout design.
    - d. Manufacturer's representative
    - e. Subcontractors or installers whose work may affect or be affected by the installation of this system.

#### 1.14 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of mobile shelving systems that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to the following:
    - a. Deterioration of metals, metal finishes, and other materials beyond normal wear.
    - b. Structural failures including, but not limited to, excessive deflection.
    - c. Failure of operating components to function properly.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.
    - a. A minimum of one preventative maintenance inspection must take place each year during warranty.
    - b. Guaranteed 24-hour minimum response time to service call during regular business hours.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Products are based upon mobile shelving system products manufactured by Spacesaver Corporation. Comparable products meeting the specification requirements include the following:
  - 1. Datum Filing Systems, Inc.

2. Montel Inc.
3. Richards-Wilcox, Inc.

- B. Source Limitations: Obtain mobile storage systems including shelving from single manufacturer.

## 2.2 BASIC MATERIALS

- A. General: Provide materials and quality of workmanship which meet or exceed established industry standards for products specified. Material thickness/gages are manufacturer's option unless indicated otherwise. Fabricated units from ASTM Class 1, cold-rolled commercial grade sheet or coil steel with all bends and radiuses consistent and true.
- B. Plastic Laminates: NEMA LD-3, GP-28, Vertical Grade.

## 2.3 GROUT

- A. General:
1. Shall be ready-mixed high strength; controlled expansive grout with superior dynamic load stability, which when mixed with water shall harden rapidly to produce a permanent foundation for the mobile storage system. Grout shall be non-corrosive, non-metallic a non-shrink. The grout after curing shall have a minimum strength of 8000 pounds (3629kg) per square inch.

## 2.4 SYSTEMS AND COMPONENTS

- A. Rail:
1. Material: ASTM/AISI Type 1035 or 1045 steel, manufacturer's selection.
  2. Capacity: 1,000 pounds per lineal foot of carriage.
  3. Minimum Contact Surface: 5/8-inch wide.
  4. Provide rail sections in minimum 6-foot lengths.
  5. Rail configuration shall permit attachment to top of structural floor system with provision for leveling rails to compensate for variations in floor surface level.
  6. Provide rail connections designed to provide horizontal and vertical continuity between rail sections, to gradually transfer the concentrated wheel point load to and from adjoining rail sections. Butt joints are not permitted.
  7. Rail Form Covers: Manufacturer shall provide for protection if required to prevent damage to rails during concrete back pours.
- B. Carriages:
1. Provide manufacturer's design movable carriages fabricated of welded or bolted steel construction. Galvanized structural components and/or riveted carriages are unacceptable.

2. Provide fixed carriages of same construction and height as the movable carriages, anchored to rails. Setting fixed shelving directly on floors is not permitted.
3. When required, provide bolted carriage splices designed to maintain proper unit alignment and weight load distribution.
4. Design carriages to allow the shelving uprights to recess and interlock into the carriages a minimum of 3/4-inch. Top mount carriages are unacceptable.
5. Provide each carriage with two wheels per rail.

C. Drive / Guide System:

1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.
  - a. If synchronized drives are used, a minimum of one-wheel assembly driving both sides of carriage at center location required. Drive shaft shall exhibit no play or looseness over the entire length of that assembly.
2. Shafts: Solid steel rod or tube.
3. Shaft Connections: Secured couplings.
4. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.

D. Wheels:

1. Capacity: Minimum load capacity per wheel: 3200 lbs. (1455kg).
2. Size: Minimum 5-inches outside diameter drive wheels.
3. Guides: Determined by manufacturer; minimum 2 locations.

E. End/Face Panels:

1. Materials: Plastic laminate clad particle board with plastic edging on vertical edges.
2. Finishes: Selected from manufacturer's standard available colors and patterns.

F. Accessories:

1. Optional Waist High Carriage Security Locks: Provide manufacturer's standard.

## 2.5 HIGH-DENSITY MOBILE STORAGE UNIT SHELVING

A. Shelving Units:

1. Type: Standard high density mobile and fixed shelving units.
2. Configuration: Double-faced and single-faced units with full-shelving back panels.
3. Width: Refer to drawings.
4. Height: Refer to drawings.
5. Shelf Depth: Refer to drawings.



B. Lateral File Units:

1. Type: Standard high-density mobile and fixed lateral file units.
2. Configuration: Double-faced and single faced units.
3. Width: Refer to drawings.
4. Height: Refer to drawings.
5. File Depth: Refer to drawings.

2.6 FABRICATION

- A. General: Coordinate fabrication and delivery to ensure no delay in progress of the Work.
- B. Wheels: Provide precision machined and balanced units with permanently shielded and lubricated bearings.
- C. Carriages: Fabricate to ensure no more than ¼-inch maximum deviation from a true straight line. Splice and weld to ensure no permanent set or slippage in any spliced or welded joint when exposed to forces encountered in normal operating circumstances.

2.7 FINISHES

- A. Colors: Selected from manufacturer's standard available colors.
- B. Paint Finish: Provide factory applied electrostatic powder coat paint. Meet or exceed specifications of the American Library Association.
- C. Laminate Finish: Provide factory applied laminate panels at locations indicated on approved shop drawings.
- D. Edgings: Provide preformed edging, color-matched to unit colors selected.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine areas, with Installer Present, for compliance with requirements for installation tolerances, location of framing and reinforcements and other conditions affecting performance of mobile shelving systems.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Ensure that recesses for rails in floors are at proper spacing and depths, with allowance for grouting.

- D. Verify that intended installation locations of mobile storage units will not interfere with, nor block established required exit paths or similar means of egress once units are installed.

### 3.2 INSTALLTION:

#### A. Rails

1. Lay out rails using full length units to the maximum extent possible. Use cut lengths only at the ends to attain total length required. Locate and position properly, following dimensions indicated on approved shop drawings.  
  
Verify thickness of finished floor materials to be installed (by others) and install level, 1/16-inch above finished floor surfaces.
2. Verify level, allowing for a minimum 1/4-inch of grout under high points. Position and support rails, so that no movement occurs during grouting.
3. Set rails in full grout bed, completely filling any voids entire length of all rails, including rail connectors. Trim up sides flush with rails to ensure proper load transfer from rail to supporting floor. Using shims in lieu of full grouting is not permitted.
4. Installation Tolerances: Do not exceed levelness of installed rails listed below:
  - a. Maximum Variation from True Level Within Any Module: 3/32-inch.
  - b. Maximum Variation Between Adjacent (Parallel) Rails: 1/16-inch, perpendicular to rail direction.
  - c. Maximum Variation in Height: 1/32-inch, measured along any 10 ft. rail length.

#### B. Shelving Units Installation:

1. General: Follow layout and details shown on approved shop drawings and manufacturer's printed installation instructions. Position units level plumb; at proper location, relative to adjoining units and related work.

#### C. Carriages:

1. Place movable carriages on rails. Ensure that all wheels track properly and centering wheels are properly seated on centering rails. Fasten multiple carriage units together to form single moveable base where4 require.
2. Position fixed carriage units to align with moveable units.

#### D. Shelving Units:

1. Permanently fasten shelving units to fixed and movable carriages with vibration-proof fasteners.

2. Stabilize shelving units following manufacturer's written instructions. Reinforce shelving units to withstand the stress of movement where required and specified.
3. Level and plumb shelving units to a tolerance of 1/8-inch in 96-inches.
4. Starter/Adder Units: Connect groups together with standard fasteners according to manufacturer's written instructions, using concealed fasteners where possible.
5. Install shelves in shelving units at locations indicated on Drawings and according to manufacturer's written instructions.
6. Shelving Enclosure Panels: Install end panels and canopy tops with concealed fasteners

### 3.3 FIELD QUALITY CONTROL

- A. Verify shelving unit alignment and plumb after installation. Correct if required following manufacturer's instructions.
- B. Remove components which are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

### 3.4 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as described on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original finish, as approved by Architect.
- C. Protect installed products from damage during remainder of the construction period.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain mobile storage shelving.
- B. Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end user personnel would normally perform.

3.6 PROTECTION

- A. Protect system against damage during the remainder of construction period. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

END OF SECTION 105626

## SECTION 105700 RAPID ENTRY LOCKBOX

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Rapid Entry Lockbox.

## 1.3 ACTION SUBMITTALS

- A. Product Data.
- B. Colors and finishes.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificate.
- B. Written approval from local Fire Department having jurisdiction noting location of Rapid Entry Lockbox.

## 1.5 COORDINATION

- A. Coordinate installation and location of Rapid Entry Lockbox with the local Fire Department having jurisdiction.
- B. Coordinate layout and installation of Rapid Entry Lockbox with other construction including electrical components and partition assemblies.

## PART 2 - PRODUCTS

## 2.1 RAPID ENTRY LOCKBOX

- A. Manufacturers: Subject to compliance with requirements, provide Knoxbox Model #3275 along with the recessed mounting kit as manufactured by Knox Company or comparable product by one of the following:

1. Kidde
2. Supra Systems

## 2.2 MATERIALS

### A. Steel: Comply with the following:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Steel Sheet: ASTM A 1011/A 1011M.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for alignment of mounting substrates, installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions. Complete equipment field assembly where required.

### 3.3 ADJUSTING

- A. Adjust movable components of Rapid Entry Lockbox to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

### 3.4 CLEANING

- A. After completing installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace Rapid Entry Lockbox if finish cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 105700

## SECTION 107316 ALUMINUM CANOPIES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

- 1. Aluminum canopy with flat soffit, hanger rods and accessories.

- B. Related Sections:

- 1. Section 034100 - "Precast Structural Concrete" for anchoring the canopy to the precast panel wall.
  - 2. Section 42113 - "Brick Masonry" for anchoring the canopy to the brick veneer wall.
  - 3. Section 055000 - "Metal Fabrications" – for miscellaneous steel framing, supports and attachments to substrate.
  - 4. Section 076200 - "Sheet Metal Flashing and Trim" for metal coping, flashing and trim.

## 1.3 ACTION SUBMITTALS

- A. Product Data.
- B. Shop drawings. Submit shop drawings showing structural component locations/positions, material dimensions and details of construction and assembly.
- C. Colors and Finishes. Submit manufacturer's standard color and finish options for Architect's selection.
- D. Samples of hanger rod, canopy corner, including scupper, soffit, and fascia.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificate.
- B. Engineered calculations. PE Stamped calculations are required and must be signed and sealed by an engineer licensed within the state canopy is installed. Canopy shall comply with all applicable building codes.

## 1.5 COORDINATION

- A. Coordinate installation and location of aluminum canopy with trades as applicable.

## PART 2 - PRODUCTS

### 2.1 ALUMINUM CANOPY

- A. Basis-of-Design Product: Subject to compliance with requirements provide Super "Lumideck Flat Soffit Hanger Rod Canopy" along with related accessories as manufactured by Mapes Canopies (888.273.1132) or comparable product by one of the following:
  - 1. Architectural Shade Products.
  - 2. Jag Metal Solutions
  - 3. MASA Architectural Canopies.
  - 4. Mitchell Metals.
  - 5. Superior Mason

### 2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 and ASTM B 429 6061-T6 alloy and temper.
- B. Fasteners: Stainless-steel or hot dip galvanized for corrosion resistance.
- C. Wall plate: 8-inches square finished to match canopy.
- D. Attachment: Standard configuration, 1-inch diameter schedule 40 steel hanger pipe assembly. Hanger rods and attachment hardware shall be a standard finish to match canopy.
- E. Intermediate Framing: Members shall be extruded aluminum, alloy 6063-T6. 3-inch by 2.5-inch by .25-inch support "I" beam
- F. Fascia: 8-inch smooth face extruded aluminum.
- G. Soffit: Extruded flat; 3-inches by 6-inches by .078-inches interlocking decking.
- H. Escutcheon Plates: 8-inch square shape.
- I. Mounting: Tilt-up wall with expansion anchor or thru-bolt anchor.
- J. Scupper/Downspout at Sallyport Canopies: 2-inch diameter drain hole and .032-inch aluminum drainage scupper with 3-inches by 4-inches downspout.
- K. Canopy Sizes: Refer to drawings.



## 2.3 ALUMINUM FINISH

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF (Polyvinylidene Fluoride) or FEVE resin by weight in color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Color and Gloss: Custom as selected by Architect.
- B. Fabricate extruded aluminum canopies with the materials precut to size for field assembly.
- C. All connections shall be mechanically assembled utilizing 3/16-inch fasteners with a minimum shear stress of 350 lb.
- D. Decking shall be designed with interlocking roll-formed aluminum members.
- E. Drainage: Water shall drain from covered surfaces into scuppers and be directed to pavement surface to underground storm sewer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for alignment of mounting substrates, installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions. Complete equipment field assembly where required.
- B. Provide flashing as applicable.

### 3.3 ADJUSTING

- A. Adjust hanger rods free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction.
- B. Install for proper water drainage via scupper or downspout. Adjust scupper or downspout as applicable to control drainage flow onto the ground.

### 3.4 CLEANING

- A. After completing installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace aluminum canopy if finish cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.
- C. Once cleaned, protect per manufacturer's recommendations.

END OF SECTION 105300

## SECTION 107500 - FLAGPOLES

## 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 ground-mounted flagpoles made from aluminum.
- B. Related Sections:
  - 1. Division 07 Section "Sealants".
  - 2. Division 26 Section "Exterior Lighting" for site lighting fixtures.

## 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to the following design criteria:
  - 1. Wind Loads: 120 mph velocity and exposure factor B according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles."
  - 2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.
- B. Shop Drawings: For flagpoles. Include plans, elevations, details, and attachments to other work. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
  - 1. Include section, and details of foundation system for ground-mounted flagpoles.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain flagpole as complete unit, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Baartol Company.
  - 2. Concord Industries, Inc.
  - 3. Eder Flag Manufacturing Company, Inc.
  - 4. Morgan Francis; Division of Original Tractor Cab Co., Inc.
  - 5. Pole-Tech Company, Inc.
  - 6. American Flagpole

### 2.2 FLAGPOLES

- A. Flagpole Construction, General: Construct flagpoles in one piece.
- B. Exposed Height: Refer to schedule, Detail 4/SD5.1.
- C. Aluminum Flagpoles: Provide cone tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm).
- D. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, not less than 0.064-inch- (1.6-mm-) nominal wall thickness. Provide with 3/16-inch (4.8-mm) steel bottom plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering wedges welded together. Galvanize steel after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.
  - 1. Provide flashing collar of same material and finish as flagpole.
- E. Sleeve for Aluminum Flagpole: Fiberglass foundation sleeve, made to fit flagpole, for casting into concrete foundation.
  - 1. Provide flashing collar of same material and finish as flagpole.

## 2.3 FITTINGS

- A. Finial Ball: Refer to Electrical drawings and specifications for requirements
- B. Internal Halyard: Ball-bearing, nonfouling, revolving truck assembly. Finish exposed metal surfaces to match flagpole. Further information and accessory requirements on detail drawings
  - 1. Halyard Flag Snaps: Provide 4 stainless steel swivel snap hooks per halyard.
    - a. Provide with neoprene or vinyl covers.
  - 2. Plastic Halyard Flag Clips: Made from Injection-molded, UV stabilized, acetal resin. Clips attach to flag and have two eyes for inserting both runs of halyards. Provide two flag clips per halyard.
    - a. Product: Subject to compliance with requirements, provide 'Quiet Halyard' flag clasp by Lingo.

## 2.4 MISCELLANEOUS MATERIALS

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.6 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, or thicker.
  - 1. Color: To be selected by Architect from manufacturer's full range.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including foundation; accurate placement, pattern, orientation of anchor bolts, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.
- B. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.
- C. Place concrete, as specified in Division 03 Section "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.
- D. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

### 3.3 FLAGPOLE INSTALLATION

- A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.
- B. Ground Set: Place sleeve, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level sleeve and allow concrete to cure. Install flagpole, plumb, in sleeve.
- C. Baseplate: Cast anchor bolts in concrete foundation. Install baseplate on washers placed over leveling nuts on anchor bolts and adjust until flagpole is plumb. After flagpole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.
- D. Mounting Brackets and Bases: Anchor brackets and bases securely through to structural support with fasteners as indicated on Shop Drawings.

END OF SECTION 107500

## SECTION 111736 – PACKAGE TRANSFER UNITS

## 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. Package transfer units.

- B. Related Requirements:

- 1. Section 042200 - "Concrete Unit Masonry" for units recessed within CMU walls.
  - 2. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.

## 1.3 COORDINATION

- A. Coordinate installation of anchorages for package transfer units. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.
- B. Coordinate size and location of openings in wall construction to receive package transfer units.

## 1.4 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles and finishes for package transfer units.

- B. Shop Drawings: For package transfer units.

- 1. Include plans, elevations, sections, and attachment details.
  - 2. Show elevations and indicate dimensions of package transfer units, preparations for receiving anchors and locations of anchorage.
  - 3. Show details of attachment of package transfer units to built-in anchors.

- C. Samples for Initial Selection: For package transfer units with factory-applied color finishes.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Examination reports documenting inspections of substrates, areas, and conditions.
- B. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
- C. Field quality-control reports documenting inspections of installed products.
  - 1. Field quality-control certification signed by Contractor and Detention Specialist.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer shall be a company that specializes in manufacturing products of the specified type with a minimum of five (5)-years experience. Installer shall be a Company that specializes in product type specified and certified for the installation by manufacturer. Manufacturer shall provide a mock-up, if required for evaluation of surface preparation and application workmanship and color/finish to the Architect for approval prior to start of work.

## 1.7 FIELD CONDITIONS

- A. Field Measurements: Verify openings for recessed package transfer units by field measurements before fabrication.

## 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver the materials to the project, handling with care to prevent damage. Store materials inside and under cover, stack flat off the floor. Project conditions (temperature, humidity and ventilation) shall be within the maximum limit recommendations set by the manufacturer. Do not install products that are under conditions outside these limits.

## 1.9 WARRANTY

- A. All materials shall be warranted against defects for a period of one (1)-year from the date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Through the design, manufacturing techniques and material application the package transfer units shall be of the "non-ricochet" type. The design should permit the encapture and retention of attacking projectile lessening the potential of a random injury of lateral penetration.



- B. The assembly shall provide single transition positions utilizing the steel box. The mechanical interlocking mechanism shall prevent the doors from being opened simultaneously, allowing packages to pass through a barrier without a breach of security.
- C. Wall mounted units shall be constructed of steel and stainless-steel all welded construction. Outer and inner interlocking doors with mechanisms that permits only one door to be in an open position.
- D. No field alterations to the construction of the units fabricated under the acceptable standards shall be allowed unless approved by manufacturer and the architect.
- E. Materials shall meet or exceed UL 752 requirements.

## 2.2 PACKAGE TRANSFER UNITS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide "Model IPP-150" package pass with vision door as manufactured by Norix Group, Inc. or a comparable product by one of the following:
  - 1. Interbank Equipment.
  - 2. Total Security Solutions.
- B. Package Transfer Unit: The assembly shall provide single or multiple transition positions utilizing the steel box.
  - 1. Frame: 7 gage welded steel construction with mounting flange.
  - 2. Door: 10 gage stainless-steel with Level 1 bullet resistant polycarbonate door vision panel.
  - 3. Hinge: 16 gage stainless-steel piano hinge.
  - 4. Nominal Size: 18-inches wide by 18-inches high by 16-inches deep.
  - 5. Operation: Interlocked doors so they cannot open simultaneously.
  - 6. Finish: Prime painted steel frame with stainless-steel door No. 4 finish.
  - 7. Bullet Resistance: Level I.
- C. Mounting: Surface and Recessed, with mounting flange formed from same material as body.
- D. Materials:
  - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
  - 2. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
  - 3. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
  - 4. Stainless-Steel Sheet, Strip, Plate and Flat Bars: ASTM A 666 or ASTM A 240/A 240M, austenitic stainless-steel, Type 304.
- E. Finishes:

1. Steel Prime Finish Housing: Clean, pretreat, and apply manufacturer's standard primer.
2. Stainless-Steel Finish:
  - a. Surface Preparation: Remove tool and die marks and stretch lines or blend into finish.
  - b. Polished Finish: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - 1) Run grain of directional finishes long dimension of each piece.
    - 2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    - 3) Directional Satin Finish: No.4.

## 2.3 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Coordinate dimensions and attachment methods of detention gun lockers with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- C. Shear and punch metals cleanly and accurately. Remove burrs.
- D. Form and grind edges and corners to be free of sharp edges or rough areas.
- E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- F. Weld corners and seams continuously to comply with referenced AWS standard and the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention gun lockers rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor

fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.

- H. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.
- I. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Locate joints where least conspicuous.

## 2.4 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16-inch thick; with minimum 1/2-inch diameter, headed studs welded to back of plate.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention gun lockers.
- B. Verify locations of detention gun lockers with those indicated on Shop Drawings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention gun lockers to in-place construction. Include threaded fasteners for concrete and masonry inserts, and other connectors.
- B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention gun lockers. Set detention gun lockers accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- D. Adjust doors and latches of detention gun lockers to operate easily without binding. Verify that integral locking devices operate properly.

- E. Field weld outer frame trim to package transfer units after installation.

### 3.3 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.
- C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- D. Prepare field quality-control certification endorsed by Detention Specialist that states installed products and their installation comply with requirements in the Contract Documents.

END OF SECTION 111736

## SECTION 111800 – SECURITY EQUIPMENT

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:

- 1. Transition window with speak-thru and deal tray.

- B. Related Sections:

- 1. Section 050553 – “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 2. Section 088000 - “Glazing” for glass types speak-thrus will be mounted in.
  - 3. Section 088853 - “Security Glazing” for security glass types speak-thrus will be mounted in.
  - 4. Section 123661 - "Solid Surfacing Countertops" for counters deal trays will be mounted in.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for security equipment.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each security equipment item required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.
- C. Samples for Verification: For each type of exposed finish required.
- D. Maintenance Data: For security equipment to include in maintenance manuals.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

## 1.5 COORDINATION

- A. Coordinate sizes and locations of mounting holes, blocking and backing required for installation of security equipment.

## PART 2 - PRODUCTS

### 2.1 TRANSACTION WINDOW

- A. Transaction Window with Speak-Thru and Deal tray: Draft free bullet-resistant transparent speak port with stainless steel or clear anodized aluminum trim for natural voice transmission.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide Model T1-3036" transaction window with speak-thru and deal try as manufactured by Covenant Security Equipment, Interbank Group, Inc. or a comparable product by one of the following:
    - 1. Armortex.
    - 2. Bullet Guard Corporation.
    - 3. C.R. Laurence Co.
    - 4. Total Security Solutions.
- B. Window:
  - 1. Window Size: Custom 48-inches wide x 52-inches high.
  - 2. Frame Size: 1-3/4-inches by 4-1/2-inches.
    - a. Material: Anodized Aluminum.
  - 3. Bullet Resistance: Level III; UL 752.
    - a. Four-ply, clear, extruded polycarbonate.
    - b. Thickness: 1.24-inches.
- C. Deal Tray:
  - 1. Pass-Thru Size: 8-inches x 11-1/2-inches x 2-inches deep.
  - 2. Material: Stainless-steel.
  - 3. Stainless-Steel flip lid built into deal tray (mounted on the internal tray area to reduce noise transmission.
- D. Speak Thru:
  - 1. Size: Nominal 6-inches.
  - 2. Bullet Resistance: Level III.
  - 3. Adjustable to accommodate .25-inch to 1.875-inch thick glazing.

## 2.2 MATERIALS

- A. Die-Cast Aluminum: ASTM B 85, manufacturer's standard aluminum alloy.
- B. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- C. Stainless-Steel Bolts and Nuts: Annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1)

## 2.3 FABRICATION

- A. Form security equipment to required shapes and sizes, with true lines and angles, square, rigid, and without warp, and with metal faces free of dents or distortion. Make exposed metal edges and corners free of sharp edges and burrs and safe to touch.
- B. Preassemble security equipment in shop to greatest extent possible to minimize field assembly.
- C. Mill joints to a tight, hairline fit.
- D. Drill or punch holes required for fasteners and remove burrs. Use security fasteners where fasteners are exposed.
- E. Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating or by applying other permanent separation as recommended by manufacturers of dissimilar metals.

## 2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Stainless-Steel Finish: No. 4 bright, directional polish on exposed faces.
- E. Aluminum Finish: Anodic Finish: Clear satin.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine substrates to which security equipment will be attached for properly located holes, blocking, grounds, or other solid backing for attachment of support fasteners.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install security equipment level, plumb, square, rigid, true. Make connections to form a rigid structure, free of buckling and warping.
  - 1. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
  - 2. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.

### 3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as security equipment is installed unless otherwise indicated in manufacturers written installation instructions.
- B. Touch up marred finishes or replace security equipment that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by security equipment manufacturer.
- C. Replace security equipment that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- D. On completion of equipment installation, clean surfaces as recommended by manufacturer.

END OF SECTION 111800



## SECTION 111900 - DETENTION EQUIPMENT CONTRACTOR

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General Conditions and Division 1 Specifications, apply to this Section.

## 1.2 SUMMARY

- A. The Detention Equipment Contractor (DEC) shall be responsible for the coordination, furnishing and installation of the work of all sections listed in the project manual summary of work.
- B. Coordinate procurement schedules for accurate and timely delivery of all materials necessary for this bid category.
- C. The DEC shall provide a minimum of 50% of the labor performed by direct employees of the DEC company. The DEC shall provide in writing a work plan noting the employees providing the labor.
- D. REFERENCES: The following organizations have standards which are referenced in this section:
  - 1. ANSI - American National Standards Institute
  - 2. ASTM - American Standard Testing Materials
  - 3. AWS - American Welding Society
  - 4. BHMA - Builders Hardware Manufacturers Association
  - 5. DHI - Door and Hardware Institute.
  - 6. NFPA-70 - National Electrical Code.
  - 7. NFPA-80 - Fire Doors, Windows.
  - 8. NFPA-101 - Life Safety Code
  - 9. UL - Underwriters Laboratories.

## 1.3 SUBMITTALS

- A. Shop drawings: Submit in accordance with Division 01 requirements.
  - 1. Provide templates for hardware and detailed drawings of equipment showing construction methods, type and gauge of metal, hardware and fittings; with plan elevation, and cross sections as required.
  - 2. Show service roughing-in connections, characteristics, and wiring diagrams for control systems.
  - 3. For concrete, precast concrete, or masonry embedded items, provide to the appropriate trade the setting drawings and templates showing anchorage.
- B. Detention Hardware Schedule:

1. Submit final detention hardware schedule signed by an Architectural Hardware Consultant who is certified by the Door Hardware Institute (DHI). Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Organize hardware schedule into hardware sets, indicating complete designations of every item required for each door or opening; and include the following information:
    - a. Type, style, function, size and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, codes, etc.
    - f. Mounting locations for hardware.
  2. Submit schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., door and frame metal work which is critical to the construction schedule).
- C. Total Submittal Package: Include with the detention hardware schedule, product data, samples, shop drawings, templates, and other descriptive data for proper coordination purposes.
- D. Samples: Prior to final ordering of finish hardware, submit one sample of each type of exposed detention hardware unit with required finish for Architects approval.
- E. Embedded Item: Detention equipment to be set in concrete, precast concrete, or CMU, by other Contractors shall be furnished and delivered by the Detention Equipment Contractor (DEC) to the building site. DEC shall furnish other Contractors with reviewed shop drawings and setting diagrams for these embedded items, such as including but not limited to, secure steel doors, frames, windows, brackets, inserts, etc., to which detention equipment attaches.
- F. Embedded items shall be set in strict accordance with reviewed shop drawings. Embedded items that do not comply with reviewed shop drawings because of improper embedment procedure or incorrect building construction or location, shall be replaced and repaired by General Contractor at no cost to the Owner or DEC.
- G. Keying Schedule for Locks: Submit a proposed keying schedule prepared in accordance with the Door and Hardware Institutes Manual Keying Procedures, Systems and Nomenclature. Coordinate keying with the Architect and the Owner.
1. DEC shall prepare and submit a drawing for each unit floor plan. The plan shall color code each lock required for review by Owner and Architect. Each lock type shall be color coded with a different color. Provide a legend for the colors and cut sheets for the locks.
  2. The Owner must approve the keying schedule in writing.

- H. Substitutions and Equivalents: Any product submitted as a substitution or equivalent shall fulfill the requirements of the specifications and have passed the same testing agency (ANSI, UL, ASTM, etc.) as referenced with the product, and include with the package an itemized list showing manufacturer, model number, sizes, finishes, noting any differences from the specified products. Also, include a sample with a written list showing the names, location, and Architects of a minimum of ten (10) institutions for which similar products have been installed.
  - 1. No substitution will be allowed after the bid date.
- I. Maintenance Manuals: Furnish two (2) hard copies of maintenance manuals in three ring binders covering all of the detention equipment for this project. Include the current name, address, and phone number of the detention equipment contractor, maintenance instructions and parts list for each type of hardware.
  - 1. Also provide two flash drives with all maintenance manual information in PDF format. PDFs shall be in color.
- J. Templates: Detention Equipment Contractor shall furnish hardware templates to the door and frame manufacturer to insure proper preparation for the installation of hardware. Check approved shop drawings to confirm adequate provisions have been made for the proper installation of items.
- K. Wiring Diagrams: Complete system wiring diagrams for all electric locks and controls shall be prepared and provided by the detention hardware manufacturer, and include lock functions, monitoring requirements, color coded conductor locations, and conductor connections.

#### 1.4 QUALITY ASSURANCE

- A. The following DEC's are approved to submit a bid on this project:
  - 1. Pauly Jail Building Company
- B. Bid submittal requirements for bidders seeking to gain pre-qualification: The owner wants to confirm that the Detention Equipment Manufacturer has the experience, management, testing, engineering, quality control, schedule compliance, and ability to adequately perform prior to award.
  - 1. Submitted information must be received two weeks prior to published bid date and time. Late information will not be considered.
  - 2. Submit the following information:
    - a. Provide a narrative and historical description of the firm from inception, including history of ownership, partnership, incorporation, and/or other organizational information. Include information on the growth of the firm over time to include the number of employees, relocation(s) of the firm, major production equipment purchases and replacements. Use only the

- current corporate or business entity, intending on bidding and performing the work, should it be awarded the work.
- b. List the firm's business volume (dollar amount) for the last five (5) fiscal years.
  - c. Provide a statement that the firm has been in business for a minimum of ten (10) continuous years, and the principals and key personnel that have been engaged in successfully providing procurement, management, installation and commissioning of security detention projects.
  - d. Provide a list of all employees in a supervisory capacity, stating their area of responsibility and their years of experience in that capacity.
    - 1) Number of years as a full-time employee of the Detention company
    - 2) Minimum years of Jail experience
    - 3) Completed training program for iron workers (if involved with equipment installation)
  - e. Submit a list of ALL detention projects completed in the last ten (10) years.
  - f. Submit a list of ten (10) projects that this corporation under its current name and management, has built in the last five (5) years comparable in size and construction (list only projects which prefabricated modular steel cell units were installed by your firm). Include in this list:
    - 1) Project Name, Owner, Contract Name, Address, Phone Number, and email address;
    - 2) Project Manager Name, Address, Phone Number and email address;
    - 3) User Agency or Government entity Name, Address, Phone Number and email address;
    - 4) Architect and Engineer of Record Name, Address, Phone Number and email address;
    - 5) General Contractor and/or Construction Manager Name, Address, Telephone Number and email address;
    - 6) Project delivery method (traditional, design/bid/build, design/build, Partnering, or other);
    - 7) Scope of the Project including total number of cells, total project square footage;
    - 8) Identify projects that used Modular Steel Cells, name of the cell manufacturer, note if cells were made with galvanized or galvalume coated steel, and interior finish of cells (epoxy, polyurea or powder coat);
    - 9) Square Footage, scope of products and services provided on that project by your company;
    - 10) Total dollar amount of the DEC contract;
    - 11) List the name(s) of the key installation foremen that are employees of your company, for each project.
    - 12) List the key installation foreman for steel cell projects that work for your firm.
    - 13) Include their names, contact information and the list of projects they have completed as an employee of your firm.
    - 14) Date of final completion and occupancy.

- g. Provide a complete list of ALL current project and highlight those which utilize prefabricated modular steel cell units installed by your firm. For each project, provide the project name, location, architect name and contact info, Construction Manager or General Contractor name and contact info, quantity of modular units (if applicable), date of contract or purchase order, start date and current status including the quantity of modular units that have been delivered/installed, and the projected completion date for the remaining balance of prefab modular units.
- h. Provide an audited financial statement from a recognized Certified Public Accountant for the three (3) past fiscal years. The format of the financial statement must be acceptable to surety for purpose of obtaining performance and payment bonds in an amount equal to at least \$3 million dollars, or the anticipated amount of the bid, whichever is less.
- i. Provide a financial statement for the current fiscal year. The format of the financial statement must be acceptable to surety for purpose of obtaining performance and payment bonds in an amount equal to at least \$3 million dollars or the anticipated amount of the bid, whichever is less.
- j. Provide a letter directly from a qualified Best Rated A+ surety company, licensed in the project state, that your firm will be able to provide 100% performance/payment bond for this project if awarded the project, but not less than \$3 million.
- k. Submit a listing of all projects in which the company is presently or has been involved in litigation, as either plaintiff or defendant within the past five (5) years, and the status thereof. In addition to this statement, please respond to the following questions 1 through 8. For any "YES" answer to the following questions, please attach a separate sheet, which provides a brief explanation of the facts, names of the parties involved, dollar amount being claimed from your firm, and the present status of the case. Attach explanations of any lawsuit alleging negligent of defective work, or breach of contract on part of the firm. Do not include lien matters, automobile accident cases, or workman's compensation cases:
  - 1) Has a court issued a judgment of \$100,000 or more against the firm or its predecessors in the past five (5) years?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
  - 2) Has the firm or its predecessors been party to the settlement of a lawsuit with a potential value of \$100,000 or more?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
  - 3) Is the firm or its predecessors currently a party to a pending lawsuit with a potential value of \$100,000 or more?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
  - 4) Within the past five years, has any key person, the firm or its predecessors defaulted on a loan?  
\_\_\_\_\_ YES \_\_\_\_\_ NO

- 5) Has the firm or its predecessors or any person of the firm or its predecessors ever been suspended or debarred by a state, federal or municipal agency?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
- 6) Within the past five (5) years, has the firm or its predecessors been terminated on or failed to complete any contract?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
- 7) Within the past five (5) years has the firm or the predecessors been responsible for significant delays in completion of a project (over 3 weeks)?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
- 8) Has the firm or its predecessor firm(s) been in Bankruptcy or receivership at any time during the past five (5) years?  
\_\_\_\_\_ YES \_\_\_\_\_ NO
- l. Provide a complete list of any projects wherein your company has been involved in a bond claim against your company for non-performance. Include the amount of claim, details of the claim, contact information (name, phone number, email address) for the Architect, Construction Manager/General Contractor, and the Owner.
- m. Provide a complete list of any manufacturers, suppliers or installers that have ever filed a claim against your company, any predecessor companies, or company principals for either non-performance or non-payment on any detention project. Include the dollar amount of the claim and the name of the company(s) and a contact name, phone number and email address.
- n. Submit for approval the names of the detention equipment manufacturers that you intend to purchase materials from. The manufacturers must be chosen from the design specifications or addendums. Alternate manufacturers will not be considered.
- 1) Submit a current letter from the detention hardware manufacturer stating that your company is a trained, fully authorized distributor and installer of their complete line of products;
  - 2) Submit a current letter from the detention hollow metal door and frame manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their complete line of products;
  - 3) Submit a current letter from the Modular Steel Cell Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their steel cells;
  - 4) Submit a current letter from the Security Window Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their windows;

- 5) Submit a current letter from the Security Glass Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their windows;
  - 6) Submit a current letter from the Detention Furnishings Manufacturer stating that you are a factory-trained, fully authorized distributor and installer for their furnishings;
  - 7) Submit a letter directly from each manufacturer you intend to include in your bid, stating that you have a customary credit relationship with that manufacturer such that you may purchase equipment directly from that manufacturer.
  - o. Submit a letter from an approved and A-15 rated bonding company that your firm can be bonded 100% for the DEC portion of this project (complete) if awarded this contract.
  - p. Provide a letter from the International Ironworkers Union or another vocational training program that your firm employs trained, bona-fide ironworkers as permanent full-time employees to install the specified security products on this project. Use of unapproved installers, or second tier sub-contractors, shall be just cause for rejection of the Bid or termination of the DEC from the project.
  - q. All decisions will be final.
- C. Approval of a firm as a DEC does not relieve that DEC from furnishing all materials from the manufacturers as herein specified.
- D. All materials and labor specified in this Section of the Specifications shall be furnished by a single qualified DEC who shall assume responsibility for the detailing, coordinating, erecting, performance, and warranty of this work, in accordance with this specification section.
- E. Approved manufacturer list.
1. Manufacturers listed as approved to bid, are required to provide proof of compliance for all items listed.
- F. Code Compliance: The work of this section shall comply with the latest requirements of the Federal, State, and local codes or ordinances, and other agencies having jurisdiction. In the event of conflict, the more stringent requirements shall apply.
1. The work shall conform to applicable sections of the Life Safety Code NFPA-101, and the National Electric code NFPA-70.
  2. Fire-rated openings shall comply with NFPA Standard Number 80. Provide only hardware which has been tested and listed by Underwriters Laboratories for these openings.
- G. Field Welding
1. Welder Qualifications: Employ only welders and tackers who are qualified by American Welding Society's testing procedure.

2. Quality: Repairing of defective welds by adding new material over the defects will not be permitted.
  3. Welds: Shall be of neat and clean appearance, and deep penetration in accordance with AWS. Joints shall be tight and true with members ground where necessary to assure a correct fit.
- H. Detention Door Testing: Upon completion of installation and before project is turned over to the Owner, the detention equipment manufacturer shall provide a factory representative to test each door. Each door shall be tested for correct installation, fit, finish and electric control if required. Upon completion of testing the manufacturers representative shall turn over to the Architect a written account of each door with deficiencies noted.
1. Notify the Construction Manager in writing at least fourteen (14) days prior to inspection.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Packaging and Delivery
1. Mark or tag each item of hardware, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
  2. Wrap and crate finished components and assemblies to prevent damage to finished items.
  3. Deliver individually packaged hardware items at the proper time and location (shop or project site) for installation.
  4. Deliver pertinent items requiring to be built-in to the General Contractor or trades in accordance with construction progress to prevent any delay.
  5. Determine and coordinate the openings for delivery and installation of equipment.
- B. Storage and Protection
1. Hardware received, but not installed shall be placed in secured storage. Control handling to prevent losses and delays before and after installation.
  2. Lay panels and flat sections flat and blocked clear of floor in a manner to prevent warping, twisting or sagging.
  3. Immediately upon delivery, inspect components and assemblies for damage. Advise manufacturer no later than two days after receipt of damaged items, the quantity and description of the items. Remove all damaged items from the site.
- C. Key Delivery: Keys shall be sent direct to the person and address as directed by the Owner, via direct mail with restricted delivery, and return receipt requested.
- D. Off-site Storage: If off-site storage is required, the following requirements apply:
1. Protect stored items from diversion, destruction, theft, and damage.
  2. Stored items shall be marked for use on the project.
  3. Stored items shall be available for inspection by Architect and Owner.



4. Copies of bill of sale for stored items shall be submitted to Architect and Owner.
5. Certificates of property insurance for stored items, protecting against damage and theft while in storage, certifying said coverage, and indicating the nature, quantity, and exact location of stored items shall be submitted to Architect and the Owner.
6. A waiver of lien shall be provided in Accordance with the Contract Documents.

#### 1.6 JOB CONDITIONS

##### A. Coordination:

1. Coordinate the work of this section with other work, and the progress schedule.
2. Provide items of proper design for use on this project as indicated and in accordance with the approved hardware schedule, door schedule, and control schedule, regardless of omissions or conflicts specified or indicated.
3. Coordinate the delivery and location of items to meet the progress schedule.
4. To the manufacturers of related equipment and trades affected by the work of this section, provide copies of the approved hardware schedule and drawings of other work to confirm adequate provisions have been made for the proper location and installation of detention equipment.

##### B. Scheduling:

1. Refer to Division 01 for specific scheduling requirements.
2. The work of this section shall be scheduled and coordinated with the Construction Manager and Owner to ensure that all detention restrictions, rules, regulations, and security measures will be maintained throughout the course of the work.

#### 1.7 WARRANTY AND SERVICE

- A. Detention Equipment Contractor shall warrant the material and workmanship on this project for a period of one (1) year after substantial completion as specified in Division 1 - General Requirements. Detention Equipment Contractor agrees to repair or replace any defective detention materials or work when given written notice during Warranty period.
- B. Manufacturer of detention hardware shall warrant that replacement parts shall be available for locking mechanisms for a minimum of twenty (20) years from the date of purchase of original equipment.
- C. Detention Equipment Contractor shall provide emergency service during the 12-month warranty period, should a major breakdown occur. Response time shall be within a 24-hour period from written notification.

#### 1.8 MAINTENANCE

##### A. Spare Parts:

1. Furnish the Owner with the following maintenance/spare parts:

Spare Parts

Quantity

- a. Electric limit switches 6 each
- b. Electric lock motor assembly 2 each
- c. Torx tamper-resistant screws 100 each
- d. Torx Tool Sets 6 each

- 2. Parts shall be packed in suitable containers clearly labeled. Deliver and store maintenance/spare parts material where directed by Owner.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install in strict accordance with the manufacturers written installation instruction, reviewed shop drawings, and as shown on the drawings.

- 1. All anchors and fasteners shall be tamper-proof.

### 3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance requirements for installation tolerances and other conditions affecting performance of detention work.

- 1. Examine roughing-in for embedded, built-in and cast-in anchors to verify actual locations of detention work connections before detention work installation
  - 2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention work.

- B. Verify locations of detention work with those indicated on Coordination Drawings.

### 3.3 FIELD QUALITY CONTROL

- A. Ensure quality of field welding of detention work and anchorages
- B. Verify that detention work is installed and connected according to the Contract Documents.
- C. Observe startup service of detention work.
- D. Observe installation and startup checks of detention work according to manufacturer's written instructions.
- E. Inspect installed detention work to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

1. Perform additional inspections to determine compliance of replaced or additional work.
  2. Prepare field quality control certification that states installed detention work and its installation complies with requirements in the Contract Documents
- F. Testing: After installing electrified detention work and after electrical circuitry has been installed and energized, test detention work for compliance with requirements.
1. When testing reveals detention work not in compliance with requirements, perform additional random testing to determine extent of noncompliance.
  2. Where test results indicate that detention work does not comply with specified requirements, retest after repairs or replacements are made.
  3. Perform additional testing and inspecting, at this Contractor's expense, to determine compliance of replaced or additional work.

#### 3.4 DEMONSTRATION/TRAINING

- A. Demonstrate to the Owner operations and maintenance of all Detention Work. Coordinate dates for training sessions with the Owner prior to scheduling dates.
- B. On-site and Detention Hardware Factory Training: Provide qualified personnel for instruction and a training period involving the Owner's designated personnel. Representatives must be capable of training Owner's personnel in the adjustment, operation and repair of detention work, including pertinent safety requirements. Instruction shall be given during the first week after detention work has been accepted and turned over to the Owner for regular operation, except if adjustment and/or repairs have been satisfactorily completed.
1. Video record all training.
- C. During the warranty period, if significant changes or modifications take place in the equipment or system, additional instruction shall be provided at no cost to the Owner.

END OF SECTION 111900

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## SECTION 111903 - SECURITY SCREENS AND WOVEN ROD

## PART 1 - GENERAL

## 1.1 SECTION INCLUDES

- A. Operable security Mesh and Woven Rod wall barriers, coiling doors, windows, and skylight coverings.

## 1.2 REFERENCES

- A. ASTM C423.
- B. ASTM E5795.

## 1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Shop Drawings: Manufacturer shall submit shop drawings, showing details of attachment to surround materials and elevations showing scope of the project.
- C. Samples of materials as may be requested without cost to owner: frame sections, woven rod panel, fasteners, mullion section, corner section, etc.

## 1.4 QUALIFICATIONS

- A. Manufacturers bidding on this project must be actively engaged in the fabrication of specified items for a minimum of Ten (10) 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 full-size physical sample, Fourteen (14) days prior to the bid date.

## 1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for combustibility requirements for materials.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

## 1.7 SEQUENCING

- A. Sequence work under the provisions of Section 013100.

- B. Sequence work to ensure security mesh and woven rod are not installed in interference or detriment of other trades
- C. Install security units after interior wet work is dry.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of design is Kane Innovations, Erie, PA.
- B. Other manufacturers must be pre-approved in writing.

### 2.2 WOVEN ROD SECURITY BARRIERS

- A. Kane model SV12Z Vantage Wall Barrier at Housing Unit Mezzanines.
- B. Kane model S-VW00 Operating Steel Vantage Wall Barrier at Indoor/Outdoor Coiling Doors.
- C. The main frame shall be built-up tubular type, measuring 1-3/4-inches x 2-1/2-inches, with fixed concealment plates. The open channel frame members shall be formed of not less than 12-gage sheet steel and shall have individual slots along the inner edges to support the woven rod panel. The corners of the main frame shall be notched for self-aligning and robotically welded. Braces, which are similar to the frame, shall be furnished when required.
- B. Concealment plates of 12-gage steel shall be welded to the back of the main frame approximately 8" on center to complete the tubular shape.
- C. Rods - Provide types as indicated on drawings.
  - 1. Woven rod panels shall be fabricated from double crimped, low carbon, mild steel 3/8-inch diameter rods, woven with rods 3-inches open space.
- D. Rod Attachment-Woven rod panels shall be installed symmetrically into the slotted main frame. Slots shall be centered according to the rod pattern. Each rod shall penetrate each slot where it contacts the main frame. Every other rod shall be welded into the slot at both ends where it penetrates the main frame.
- E. Finish-All interior surfaces of the main frame, rods and concealment plates shall be thoroughly cleaned in a 5-step bonderizing process. The surfaces shall receive an electrostatically applied thermoplastic, polyester powder coating which shall be applied and baked to a hard mar-resistant finish:
  - 1. Color: Custom as selected by Architect.

## 2.3 SECURITY SCREENS

- A. Kane "Model S-Van-O Operable Steel Security Screen". The main frame shall be of box channel design and formed of 12-gage steel. The corners of the main frame shall be notched for self-aligning and robotically welded. Braces shall be furnished when required.
- B. Concealment plates of 12-gage steel shall be applied to the back of the main frame to conceal the locking mechanism and retain the wire cloth. The concealment plates shall be attached to the main frame along the inner and outer edges by TORX® tamper-resistant screws. Inner screws shall penetrate the concealment plate; wire cloth and main frame approximately 4-inches on center.
- C. The sub-frame shall be formed of 12-gage steel on all sides. The corners of the sub-frame shall be notched for self-aligning and robotically welded on both sides to provide a rigid frame within which the main frame operates.
- D. Infill: 10-mesh .047-inch diameter stainless-steel.
- E. Infill Attachment
  - 1. The wire cloth shall be folded 90 degrees on the edges and held securely in place by means of a removable concealment plate of not less than 12-gage steel and tamper-resistant screws.
  - 2. The perforated panel shall lie flat on the main frame and held in place by means of a removable concealment plate of not less than 12-gage steel and tamper-resistant screws.
  - 3. Tamper-resistant screws shall penetrate the concealment plate and main frame along the outer edge. The inner tamper-resistant screws shall penetrate the infill, concealment plate and the main frame approximately 4-inches on center.
  - 4. Tamper-resistant screws shall be as per Specification Section 111905.
- F. Locks and Releases
  - 1. Each screen shall have a concealed actuating ball bearing, 1/2-inch diameter, casehardened steel bolts. The bolts shall operate simultaneously from one key station with a special Bitt key. Kane 107® Bitt key lock.
  - 2. At operable screens below skylights, provide two locks per skylight screen.
- G. Hardware
  - 1. Each screen shall be provided with two or more concealed 13-gage, electroplated steel hinges with 1/4-inch diameter hardened, loose stainless-steel pins and integral compression guards. Hinges shall be spaced at a maximum of 24-inches on center.
  - 2. 16-gage 3/4-inch x 1-inch steel scribes shall be supplied at the head and jambs if required. Each screen shall come fully assembled and tested from the factory.

- H. Finish-All interior and exterior surfaces of the main frame, rods and concealment plates shall be thoroughly cleaned in a 5-step bonderizing process. The surfaces shall receive an electrostatically applied thermoplastic, polyester powder coating which shall be applied and baked to a hard mar-resistant finish. Skylight color: White as selected by architect, to match color of ceilings. Screens at Overhead Coiling Doors to also be galvanized.

## 2.4 ACCESSORIES

- A. Touch-up Paint: Color to match screens and framing.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify that openings fit allowable tolerances, are plumb, level, provide a solid anchoring surface and comply with approved shop drawings.

### 3.2 INSTALLATION - GENERAL

- A. Install in accordance specifications and manufacturer's instructions and as supplemented in this section.

### 3.3 INSTALLATION – Security Screen and Woven Rod

- A. Install in accordance with approved shop drawings.
- B. Plumb and align faces in a single plane and erect barriers square and true, adequately anchored.
- C. After completion of installation, barriers shall be adjusted, in working order and clean.

### 3.4 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8-inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.



END OF SECTION 111903

## SECTION 111916 - DETENTION GUN LOCKERS

## 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. Custom fabricated, heavy-duty pistol lockers.

- B. Related Requirements:

- 1. Section 034100 – “Precast Structural Concrete” for lockers mounted on precast concrete walls.
  - 2. Section 042200 - “Concrete Unit Masonry” for lockers recessed within CMU walls or surface mounted to CMU walls.
  - 3. Section 050553 – “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
  - 4. Section 087163 - "Detention Door Hardware" for cylinders and keying for detention gun lockers.
  - 5. Section 105113 - “Metal Lockers” for visitor lockers and staff wardrobe lockers.
  - 6. Section 125500 - "Detention Furniture" for detention furniture.

## 1.3 COORDINATION

- A. Coordinate installation of anchorages for detention gun lockers. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.
- B. Coordinate size and location of recesses in wall construction to receive recessed detention gun lockers.

## 1.4 PREINSTALLATION MEETINGS

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

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention gun lockers.
- B. Shop Drawings: For detention gun lockers.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
  - 3. Indicate locations and installation details of built-in anchors.
  - 4. Show elevations and indicate dimensions of detention gun lockers, preparations for receiving anchors, and locations of anchorage.
  - 5. Show details of attachment of detention gun lockers to built-in anchors.
- C. Samples for Initial Selection: For detention gun lockers with factory-applied color finishes.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Examination reports documenting inspections of substrates, areas, and conditions.
- C. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
- D. Field quality-control reports documenting inspections of installed products.
  - 1. Field quality-control certification signed by Contractor and Detention Specialist.

## 1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
  - 2. AWS D1.3, "Structural Welding Code - Sheet Steel".
  - 3. AWS D1.6, "Structural Welding Code - Stainless Steel".

## 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify openings for recessed detention gun lockers by field measurements before fabrication.

## 1.9 WARRANTY

- A. One (1) year limited replacement warranty

## PART 2 - PRODUCTS

## 2.1 GUN LOCKERS

- A. Manufacturers: Subject to compliance with requirements, provide custom pistol lockers as manufactured by one of the following:
1. Fasco Security Products.
  2. Norix Group, Inc.
  3. PSI LLC.
  4. Southern Folger Detention Equipment Company.
  5. Willo Products Company, Inc.
- B. Description: Six (6) compartment wall surface mount, heavy-duty gun storage lockers for securing pistols.
1. Cabinets: Custom cabinets formed from 3/16-inch steel plate (front and sides) and 3/8-inch (back) welded steel construction. Line each compartment with 1/8-inch thick neoprene rubber material.
  2. Door Fronts: Formed from 3/16-inch steel plate, supported by heavy-duty continuous bottom hinge.
  3. Pistol Locker Module Size: 12-inches wide by 8-inches high by 8-inches deep.
    - a. Fixed barrel rest and neoprene rubber lined bottoms.
  4. Module Configuration: Refer to drawings for configurations.
  5. Divider: 3/16-inch welded steel divider between the individual compartments.
  6. Mounting Flange: 2-inch by 2-inch by 3/8-inch.
  7. Locks: Master keyed pin tumbler snap lock. Provide one lock for each compartment.
  8. Hinges: Concealed 14 gage continuous hinge with 1/8-inch pin.
  9. Lock Preparation: Prepare door panel to accept cylinder specified in Section 087163 "Detention Door Hardware".
  10. Mounting: Surface and recessed, with mounting flange formed from same material as body.
- C. Materials:
1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
  2. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS (Commercial Steel), Type B; suitable for exposed applications.
  3. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Finishes:
1. Steel Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

## 2.2 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Coordinate dimensions and attachment methods of detention gun lockers with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- C. Shear and punch metals cleanly and accurately. Remove burrs.
- D. Form and grind edges and corners to be free of sharp edges or rough areas.
- E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- F. Weld corners and seams continuously to comply with referenced AWS standard and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  - 5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention gun lockers rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.
- H. Cut, reinforce, drill, and tap detention gun lockers as indicated to receive hardware, fasteners, and similar items.
- I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.
- J. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Locate joints where least conspicuous.

## 2.3 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16-inch thick; with minimum 1/2-inch-diameter, headed studs welded to back of plate.
- C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- D. Number Plates: Manufacturer's standard etched, embossed, or engraved, plastic number plates with numerals at least 1/2-inch high. Numbering system shall be a three-digit number, sequenced as specified. Plates to be attached by (2) aluminum rivets and centered near the top on each door. Cushioning: 1/8-inch neoprene pad in bottom of openings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention gun lockers.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention gun lockers before detention gun locker installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention gun lockers.
- D. Inspect built-in and cast-in anchor installations, before installing detention gun lockers, to verify that anchor installations comply with requirements. Prepare inspection reports.
  - 1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
  - 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- E. Verify locations of detention gun lockers with those indicated on Shop Drawings.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention gun lockers to in-place construction. Include threaded fasteners for concrete and masonry inserts, and other connectors.

- B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention gun lockers. Set detention gun lockers accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- E. Adjust doors and latches of detention gun lockers to operate easily without binding. Verify that integral locking devices operate properly.
- F. Assemble detention gun lockers requiring field assembly with security fasteners with no exposed fasteners on exposed faces and frames.

### 3.3 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units; replace with new units.
- C. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- D. Prepare field quality-control certification that states installed products and their installation comply with requirements in the Contract Documents.

END OF SECTION 111916

## SECTION 112923 – INMATE PROPERTY PACKAGING EQUIPMENT

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Inmate personal property storage equipment.
  - 2. Inmate clothing storage device.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include installation details, material descriptions, dimensions of individual components, and finishes for each type of equipment.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

## 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For inmate property packaging equipment to include in operation and maintenance manuals.

## 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 1.6 FIELD CONDITIONS

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



## 1.7 WARRANTY

- A. Special Warranties: Manufacturer agrees to repair or replace equipment or components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two (2) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain equipment from single source from single manufacturer.

### 2.2 INMATE PERSONAL PROPERTY STORAGE EQUIPMENT

- A. Basis-of-Design Product: Subject to compliance with requirements, provide CPI/Guardian; "Model 1416J Inmate Personal Property Storage".

- B. General: Inmate personal property storage system designed to provide a tamper evident package for the storage of inmate personal property. Utilizing one-piece cardboard and one piece of plastic film, the heated plastic is bonded to the cardboard trapping the property between the layers, making it impossible to open without destroying the package.

1. Unit Cycle Time: 35 seconds.
2. Lighted E-Stop pushbutton.

- C. Dimensions:

1. Width: 32-inches.
2. Depth: 24-inches.
3. Height: 32-inches.

- D. Recommended Workspace:

1. 52-inches wide by 52-inches deep including space occupied by the equipment.

- E. Weight: Less than 150 lbs.

- F. Electric Power Supply: 208 V, 60 Hz, 1 phase, 30 A.

- G. Material Supplies:

1. Cardboard: Provide Ten (10) cases.
2. Plastic Rolls: Provide Ten (10) rolls.

## 2.3 INMATE CLOTHING STORAGE EQUIPMENT

- A. Basis-of-Design Product: Subject to compliance with requirements, provide CPI/Guardian; "Model pre5 Property Room Expander".
- B. General: Inmate clothing storage system is designed to provide a more efficient, hygienic clothing area. Clothing is sealed in the garment bag, providing a compact, odor free storage package.
  - 1. Hands free, semi-automatic.
- C. Dimensions:
  - 1. Width: 39.5-inches.
  - 2. Depth: 35.875-inches.
  - 3. Height: 64-inches (open).
- D. Weight: Less than 525 lbs.
- E. Electric Power Supply: 110 V, 1 phase, 20 A.
- F. Material Supplies:
  - 1. Small Bags: 18-inches by 28-inches.
    - a. Provide two hundred and fifty (250) bags.
  - 2. Medium Bags: 24-inches by 32-inches.
    - a. Provide two hundred and fifty (250) bags.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of equipment.
  - 1. Verify critical dimensions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Install equipment according to manufacturer's written instructions.

- B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

### 3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Perform visual, mechanical, and electrical inspection and testing for each equipment item according to manufacturers' written recommendations.
  - 2. Operational Test: After installation, start units to confirm proper operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- B. Equipment will be considered defective if it does not pass tests and inspections.

### 3.4 CLEANING

- A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium equipment.

END OF SECTION 112923

## SECTION 114000 – FOOD SERVICE EQUIPMENT

## PART 1 -GENERAL

## 1.0 SUMMARY:

- A. The enclosed list of manufacturers, are the approved manufacturers based on experience and failure rate for such a facility. Any deviation from the enclosed list without written approval will not be accepted and may cause said bid to be dismissed. Alternate submissions filing period will be within 5 working days of the bid release date.
- B. The request must be submitted in writing to the Architect of record. Such requests must give: Manufacturer name, correctional facilities currently with said manufacturer and model listed product. Fabrication shall be submitted as detailed and with the design intent, remaining in place. Any deviation from the listed Specification as noted in each item of fabrication and outlined in the Stainless Innovations or South Jersey Metal Fabricators or Carbone Fabrication specification outline will not be accepted.
- C. All fabricated items must be fully welded in place and counters will be mounted to CMU walls by way of "Z" Clips. Any Fasteners used must be Tamper proof and listed for Correctional. All listed accessories and Correctional Proof (C.P.) notation will be strictly enforced.

## 1.1 SCOPE:

- A. Work includes the furnishings and setting in place Food Service equipment as shown on the Drawings and per the specifications as hereinafter specified ready for connections by "Contractor" under Plumbing, Heating and Ventilation and Electrical sections.

## 1.2 GENERAL REQUIREMENTS:

- A. All items shall be delivered to the site, uncrated, set in place, and leveled under these specifications. Items shall be kept dry and clean.
- B. Provide all labor, materials, equipment, appliances, tools, articles, and all operations required to provide a complete food facilities equipment installation ready for continuous and satisfactory service in accordance with specifications and applicable Drawings.
- C. The specifications and Drawings are intended to cover the furnishing and installation of all itemized equipment including hood and walk in refrigerators.

- D. The Contractor shall be responsible for each item of equipment complying with the requirements of and being approved by the local and state health departments.
- E. All equipment shall be complete with all usual wiring, switches, controls, valves, vacuum breakers, regulating valves, Required Seismic Attachments and/or Restraints, etc., to conform to the requirements of:
  - 1. National Sanitation Foundation, Inc.
  - 2. National Fire Protection Association.
  - 3. American Gas Association.
  - 4. Public Health Service.
  - 5. Office of Local Fire Marshal.
  - 6. Underwriter's Laboratories, Inc. (Chicago, Ill.)
  - 7. Air Conditioning and Refrigeration Institute.
  - 8. National Electrical Code.
  - 9. Board of Fire Underwriters.
  - 10. American Welding Society.
  - 11. SMACNA Guidelines.

### 1.3 SUBMITTALS:

- A. Shop Drawings Submit complete, detailed shop Drawings and manufacturer's catalog showing all dimensions and rough in requirements for fabrication and installation of each item of kitchen equipment in accordance with the procedure specified and obtain approval of the Architect before fabrication is begun. The Architect's shop drawing approval does NOT absolve the fabricator of the obligation to insure that all items fit within their assigned space and work as designed or intended.
- B. All equipment to be custom fabricated is to be fully detailed and dimensioned to a minimum scale of 3/4-inch to the foot for plan and elevation views and 1 1/2-inch to the foot for sectional views.

**1.4 PRODUCT HANDLING:**

- A. All equipment shall be received at the building crated and fully protected. It will be the responsibility of the Food Service Contractor to protect the equipment until completely installed and accepted.

**1.5 PERMITS AND REGULATIONS:**

- A. The Food Service Contractor shall procure and pay for all permits and licenses necessary for execution of his work.
- B. The Food Service Contractor shall comply with all laws, ordinances, rules, orders and regulations relating to the performance of the work, the protection of adjacent property and the maintenance of passageways, guard fences and other protective facilities, as required.
- C. The Food Service Contractor shall supply any and all certificates of compliance required by local government agencies prior to acceptance of equipment.

**1.6 CORRECTION OF WORK:**

- A. All work, all materials, whether incorporated in the work or not, all process of manufacture, and all methods of construction shall be at all times and places subject to the inspection of Architect who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture and methods of construction for the purposes for which they are used. Should they fail to meet his approval they shall be forth with reconstructed, made good, replaced and/or corrected, as the case may be, by the Food Service Contractor at his own expense. Rejected material shall immediately be removed from the site.

**1.7 FIELD DIMENSIONS:**

- A. All sizes given are approximate and are as accurate as can be determined at this time. Food Service Contractor shall check all measurements at the building prior to fabrication of equipment. All equipment must conform to the finished building conditions. Where obstructions occur, equipment must be neatly scribed, fitted to and around same resulting in a sanitary, homogeneous fixture.

**1.8 CHANGES IN THE WORK:**

- A. Architect reserves the right to require the Contractor to make reasonable modification in the routing of work and relocation of equipment.

This specifically refers to conditions where interference occurs or where more desirable accessibility can be obtained or whose materials cannot be installed because of structural or mechanical conditions encountered.

1.9 TESTING AND REGULATING:

- A. The Food Service Contractor must test and regulate all equipment in the presence of the Architect proving it to be operating properly and also provide instruction in the use of any item requested, after the final installation.

PART 2 – PRODUCTS

2.0 MATERIALS:

- A. All materials and equipment shall be new and of best commercial grade. Use product of one manufacturer where two or more items of same kind of equipment are required.
- B. Workmanship throughout shall be of the highest grade, in accordance with the best practice and most modern methods. All parts shall fit together securely and accurately. Field joints are to be provided only for the convenience of installation and shipping and shall be held to a minimum. Joints shall be provided with butt straps on the underside of the top so that tops can be pulled together tightly forming a hairline, watertight connection. All field joints shall be welded, ground and polished to a #4 finish. There shall be no exposed bolts or rivets on the top except where construction necessitates, and approval is obtained.
- C. Stainless-steel (S/S) shall be type 304, extra low carbon nonmagnetic, austenitic 18% chrome 8% nickel corrosion resisting alloy steel. Sheets shall be flat, free of all buckles and surface imperfections. Type 300 and 400 grade S/S will not be accepted.
- D. Galvanized iron (GI) shall be an approved grade copper bearing steel. Zinc coating shall be applied after fabrication (brake or die forming, drilling, fitting, welding or other operations). Finish of G.I. to be two coats of epoxy based gray hammertoe paint on prime undercoat over thoroughly cleaned surfaces.
- E. All gauges for sheet iron and sheet steel shall be U.S. Standard gauges and finished equipment gauge thickness shall not vary more than 5% plus or minus from thickness indicated below:

## Gauge Thickness Gauge Thickness

#10 0.1406 #16 0.0625

#12 0.1094 #18 0.050

#14 0.0781 #20 0.0375

- F. Unless otherwise specifically called for herein, no material lighter than #20 gauge shall be incorporated into the work.
- G. Stainless-steel pipe and tubing shall be seamless steel sheets.
- H. Structural sheet members used for framing consisting of angles, bands, bars, channels, etc., shall be ductile in quality, free of hard spots, runs, checks, cracks and other surface defects. They shall be smooth, galvanized by the hot dip process with all surplus removed and free of runs, blisters, excess shelter and uncoated spots or patches.
- I. White metal shall consist of corrosion resistant metal containing not less than 30% nickel. All castings shall be rough ground, polished and buffed to bright luster, free from pit marks, runs, checks, burrs and other imperfections. In lieu of white metal castings, 18 X 8 stainless-steel die stamped or cast will be acceptable.
- J. All welding shall be done by the Heli arc method. All welding shall be done in a thorough manner with welding rod of the same composition as sheets or parts welded. Welds shall be complete welds, strong and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces. Welds are to be free of mechanical imperfections, such as gas holes, pits, runs, cracks, etc. All joints in tops, sides and ends of fixtures, tables, drain boards, over shelves, sinks, etc. shall be continuously welded so that the fixtures shall appear as one-piece construction. Butt welds made by spot welding straps under seams, filling in the voids with solder, and finished by grinding, will not be acceptable. Welding shall conform to American Welding Society (AWS) requirements.
- K. Spot welds shall have a maximum spacing between welds of 3 inches. Tack welds shall have at least 1/4-inch length of welding material at a maximum spacing of 4 inches. Welds at the ends of channel battens shall not exceed 2 inch centers.
- L. All Exposed surfaces shall be free from bolt, screw and rivet heads. When bolts are required they shall be of concealed type and be of similar composition as the metal to which they are applied. Where bolt or screw threads on the interior of fixtures are visible or may come in contact with heads or wiping cloth they must be capped with a acorn nut with a lock washer.



- M. Where screw threads are not visible or readily accessible, they may be capped with a standard lock washer and steel nut treated to prevent rusting or corroding. Where bolts or screws are welded to the underside of trim or tops, the reverse side of the weld shall be neatly finished uniform with the adjoining surface of the trim or the top. Depressions at these points will not be acceptable. Rivets shall not be used as a method of fastening in any location.
- N. All welds, bolts, screws, nuts, washers and rivets shall be steel except where brass or is fastened, in which case they shall be brass or respectively. Where dissimilar metals are fastened, the fastenings shall be of higher grade metal. Spacing and extent of welds, bolts, screws and rivets shall insure suitable fastenings and prevent bulging of metals fastened.
- O. In no case shall soldering, riveting, tack or spot welding at any time be considered as a replacement for welding, nor shall any soldering operation be done where dependence is placed on stability and strength of the joint or fixture proper.
- P. In general, fixtures shall be shop fabricated of one-piece construction, shipped to the job completely assembled. Equipment too large to transport or enter the building as one piece shall be constructed so that welded field joints can be made at the job site.
- Q. Joints welded at the job site shall be equal to construction as specified above.
- R. Trim is not an acceptable substitute for accuracy and neatness; and when trim is required and accepted by the Architect in lieu of rejection of items of equipment, it is the Food Service Contractor's responsibility to provide same at no additional cost.
- S. All equipment that rests on masonry bases shall be set level into a bed of silicone rubber sealant and it is the responsibility of the Food Service Contractor to coordinate his equipment to the base.
- T. All equipment that butts or is adjacent to a wall shall be scribed and sealed to the wall with silicone rubber sealant and suitably fastened to wall with fasteners a minimum of 48-inches on center.

## 2.2 GRINDING, POLISHING, FINISHING:

- A. All Exposed, welded joints shall be suitably ground flush with adjoining material and neatly finished to harmonize therewith. Wherever material has been sunken or depressed by welding operation, such depressions shall be suitable hammered and peened flush with the adjoining surface and, if necessary, again ground to eliminate low spots.

In all cases the grain of rough grinding shall be removed by successive fine polishing operations. All shall have a No. 4 finish on all exposed surfaces and a No. 2 finish on all concealed surfaces.

- B. All unexposed welded joints on under shelves of tables or counters in construction shall be suitable coated at the factory by means of metallic base paint to prevent possible corrosion at such locations.
- C. After galvanized iron members have been welded, all welds and areas where galvanizing has been damaged shall be re coated to prevent oxidation. Submit a sample of re coated area complete with a detailed explanation of the method to be used for approval before proceeding.
- D. Butt joints and contract joints, wherever they occur, shall be close fitting and shall not require solder as a filler. Wherever break bends occur they shall be free of undue extrudence and shall not be flaky, scaly or cracked in appearance of the material all such marks shall be removed by suitable grinding, polishing and finishing. Wherever sheared edges occur they shall be free of burrs, fins or irregular projections and shall be finished to obviate all danger of cutting or laceration when the hand is drawn over such sheared edges. In no case are overlapping materials to be acceptable where miters or bull nosed corners occur.
- E. The grain of polishing shall run in the same direction on all horizontal and on all vertical surfaces of each individual item of fabricated equipment, except in the case where table or sink tops join at right angles, where the finish of the horizontal sections of each terminating in a mitered edge shall be acceptable. Where sinks and adjacent drain boards are equipped with splash back, the grain of polishing shall be consistent in direction throughout the length of the splash back and sink compartment.
- F. Where surfaces are disturbed by the fabricating process, such surfaces shall be finished to match the adjoining surfaces.
- G. Final Polishing: At the completion of the installation work, all shall be gone over with a portable polishing machine and buffed to perfect surfaces. All painted surfaces shall be carefully gone over and retouched as required.

## 2.3 FABRICATION: Correctional Package

- A. Metal Table Tops: Construct of 14-gauge with front, sides and backs finished in 1 1/2-inch diameter rolled edge or fully detailed bullnose edges. Bullnose edge must be fully detailed in the submittal shop drawings for approval. Round all corners, weld, grind and polish.

Reinforce underside of top with hat channels welded in place. Stud Screws Will Not Be accepted. Arrange reinforcing so that gussets for legs hereinafter specified can be welded to full flat surfaces of reinforcing.

- B. Dish Table Tops: Construct of 14-gauge with all edges turned up 3-inch and terminating in a 1 1/2-inch diameter rolled rim. Round all corners, weld, grind and polish. Reinforce underside of top with #14-gauge 4-inch X 1-inch channels plug welded to top and 1-inch X 3-inch inverted hat channels except where indicated differently. Close ends of all channels with neatly welded cap of same material.
- C. Tubular Frame Base: Construct of 1 5/8-inch O.D. #16-gauge legs with longitudinal and lateral cross braces of 1 1/4-inch. Weld between legs and bracing shall be ground smooth and polished to a uniform finish. Fit each leg with a fully enclosed circular gusset and stainless-steel adjustable bullet foot with modified toe portion to receive 5/16-inch floor pin when specified. Legs shall be provided as indicated in the details.
- D. Cabinet Bases: Constructed with tops as specified except when adjacent to wall, turn edges up 4-inch and back 2-inch on 45 degrees angle to wall with ends boxed. Also maintain 3/4-inch clearance for cleaning where rolled table top bottom edge turns back to cabinet body. Cover corners of raised edge both vertically and horizontally as specified. Secure tops to understructure by welded and concealed studs with washers and nuts. Construct understructure entirely of #16 or #18-gauge as specified.
  - 1. Completely enclose vertical corner members with #18-gauge. Attach all trim so that no bolt, screw or rivet heads are visible from the exterior. Extend the body enclosure sheets around the front to trim the front opening, with all seams welded ground and polished. Provide with fixed bottom and one intermediate #16 or #18-gauge fixed or removable shelf as specified.
  - 2. When indicated or specified provide sliding doors constructed with #18-gauge, double walled and sound deadened. Mount doors on case hardened ball bearing type rollers sliding on dust proof channel tracks overhead fastened in such a manner as to eliminate vibration and jarring when doors are operated. Provide door bumpers and a bottom center pin guide. Provide doors with recessed handle. In general, cabinet bases are to rest on legs.
  - 3. Legs shall be equipped with adjustable bullet type feet. Bottom construction shall be completely enclosed. Open end channels, leg supports with openings and similar openings resulting from the addition of structural shapes for support or mounting will not be accepted unless all joints are closed with metal sheets or weld.

- E. Drawers: Drawers shall be indicated on the Drawings. Drawers shall be constructed of Drawer front shall be #16-gauge double pan construction having a die stamped pull. Drawers shall operate in a pair of double slides equal to Knipe and Vogt No. 1500 equipped with metal roller bearing slides and automatic stops, and front recessed pull. Drawers in refrigerated bases to have 14-gauge extensions slides with 2-inch diameter wheels and bearings grease packed before assembly and corrosion resistant. Refrigerated drawers shall be properly insulated, and shall properly seal for an air tight, non-sweating seal. Provide heater strips where needed to prevent freeze up. Drawers to be self-closing and removable for easy cleaning. Provide two full-size stainless-steel steam table pans for each. Drawer face to be double wall #18-gauge No. 4 finish with insulation and recessed pull and full perimeter gasket.
- F. Overhead Shelves for Tables: Construct of #16 gauge polished with all edges turned down and finished in a 1 1/2-inch diameter 180 degrees roll, with corners welded, ground and polished. Shelves shall be supported by 1-inch O.D. #16 gauge polished tubular uprights, tapered at top and flared at the bottom and secured to top with concealed inset tie rods, bolts and nuts. Uprights shall be spaced approximately 42-inches on center.
- G. Wall Shelves: Construct of #18 gauge polished with the back and side edges turned up 2 inches and the front turned down in a 1 1/2-inch diameter 180 degrees' integral role. Shelves shall be supported by #14-gauge brackets. Undersides of shelves shall be secured to brackets by means of concealed welded studs, nuts and washers. Brackets shall be spaced no more than 60 inches on center.
- H. Under shelves: Construct of #18-gauge. Roll shelves in 1 1/2-inch diameter rolled edge or up 2 inches as detailed. Notch shelves and weld to fit legs. Reinforce the underside as required with cross channels constructed of #16 gauge. All signs of welding on shelf surface shall be removed, ground and polished smooth to a uniform finish.
- I. Removable Shelves: Construct removable shelves in cabinet base units, sectional of #18-gauge. Turn up edges of shelves 1-inch against cabinet walls. 1 inch turn down front edge of shelves 1 1/2-inch and hem 3/4-inch to stiffen them.
- J. Sinks: Construct of #16-gauge with all interior corners rounded to a 3/4-inch radius both horizontally and vertically, forming a cove in the bottom. All joints shall be butt edged, electrically welded, ground and polished so no evidence of welding will appear. All sink sizes established in the specifications to be inside measurements. Bottom of each compartment shall be creased to the center and fitted with a 2-inch rotary operated waste outlet (Example: Krowne Metal #22-404) with a stainless-steel flat strainer and overflow assembly. Overflow shall consist of a 1 1/2-inch strainer plate, fitted in back of each compartment at proper level and directly connected to the lever handled waste outlet.

Sinks to be attached to drain boards shall be finished on the front and back edges only and left with a straight edge on the ends so that the drain boards may be continuously electrically welded thereto forming integral units with the top edge of the rolled rim curbing formed on one horizontal plane across the front of the unit through the surfaces of the drain boards. The drain boards shall be pitched to the sinks.

- K. Multiple compartment sinks shall be divided with double wall #16-gauge partitions, having all corners rounded the same as other corners in sinks, continuously electrically welded in place with welds ground smooth and polished. The back, bottom and front shall be of one continuous piece with no overlapping joints or open spaces between the compartments.
  - 1. Faucets shall be as manufactured by Krowne Metal, Wayne, NJ; T & S Brass and Bronze Works, Co., Westbury Long Island. or Fisher Faucet Company.
  - 2. Waste outlets shall be as manufactured by Krowne Metal Wayne NJ, T & S Brass and Bronze Works, Co., Westbury Long Island; Kenco Products Corporation, Englewood, New Jersey; or equal as approved by consultant.
- L. Inset Sinks: Construct as specified above for sinks and make an integral part of the top. Tabletop behind sinks shall be punched to receive a deck type combination faucet, unless splash mount has been specified.
- M. Drain boards: Construct of #14-gauge full width of sink having a 3-inch-high curbing at front, back and end. All corners shall be continuously electrically welded to sinks and the welds ground smooth and polished to appear as one continuous unit. Drain boards over 24 inches long shall be provided with legs and cross bracing as specified for tubular frame bases.
- N. Trough Drains: Construct of #16-gauge integral with top 4 1/2-inches wide by 1-inch-deep by length required with coved corners. Box type construction will not be accepted. For standard duty installations, Correctional troughs will have lock nut type security feature. The lock nut feature will have the appropriate tool for removal supplied as a part of the trough completion and will not be charge as an extra, but yet a part to the trough.
- O. For heavy duty installations where load weights may be an issue, use the product of IMC Teddy SG ADA type 304 grating, or a submitted and approved equal. If Grating is not factory cut, finish cut edges as per manufacturer's recommendations. Provide 1- 1/2-inch chrome plated or stainless-steel strainer plate and 1-inch O.D. tubing drain.
- P. After Fabrication of food service equipment, apply peel off adhesive type heavy protection reinforced paper to all stainless-steel surfaces. Equipment shall be wrapped, padded and crated when shipped. Dented, scratched or otherwise defaced surfaces shall be removed and replaced.

## Doors:

1. Cabinet doors to be double cased with #18-gauge No. 4 finish exterior and #20-gauge interior. Correctional Door shall be feature with a Lock "Heavy Duty Type" All stainless.
2. Hinged doors to be mounted on piano hinges, and to have latches equal to Magnetite No. 592. Provide recessed stainless-steel pulls.
3. Side sliding doors to be double cased , same as hinged doors, but mount on concealed overhead track with large diameter ball bearing rollers.
4. Refrigerated doors fabricated as above with insulation and mounted on standard Keli "Edgemont" hinges and latches. Said doors to be properly sealed for a "Sweat proof" seal, and heater strips used where necessary to prevent freeze up.

Q. Ducts: Verify size and position of all exhaust duct connection required for hoods, ventilators, washers and appliances; furnish and install #16-gauge all welded ducts to ceiling connection location. Welds on seams shall be continuous. Include duct collar at exposed connection. All work is to be completed by a licensed contractor.  
All work must meet all Local Codes.

## R. Undercounted Refrigerators:

1. Outer casing shall be constructed, of #18-gauge , inner liner shall be of #22-gauge with #2B finish unless shown otherwise.
2. Refrigerator shall be fully insulated with 2-inch minimum thickness of urethane or Styrofoam between outer casing and inner liner at top, bottom, and sides including doors.
3. Entire perimeter of door opening shall be faced with a 1/8-inch black Bakelite thermal breaker strip approximately the width of the mullion. Breaker strip at door sill shall be faced with #16-gauge .
4. Door shall be constructed with #18-gauge outer casing and #20-gauge , #2B finish, inner lining, unless shown otherwise. Molded grey vinyl latex door gasket shall be attached to perimeter of doors with concealed fasteners.
5. Drawer fronts shall be of same materials as specified for doors. Insulation shall be of same material as used in refrigerator walls and shall be a minimum of 1-inch in thickness, and shall prevent sweating. Provide heater strips where necessary to prevent freeze up.
6. Where cut outs in refrigerator top are specified or shown on detail Drawings, raw edges of cut metal and insulation shall be covered with sleeve. Counter top shall be turned down into opening to overlap sleeve with thermal barrier installed between.  
A stainless-steel expanded metal guard shall be furnished for the full length and width of opening with sides to underside of refrigerator interior with closed bottom of guard located 6 1/2- inches below counter top.

## S. Ice Bins and Cold Pans:

1. Inner lining shall be constructed of #18-gauge and outer casing shall be of #18-gauge galvanized iron, unless shown otherwise.
2. All ice bins and cold pans shall be fully insulated with 2-inch minimum thickness of urethane or Styrofoam between outer casing and inner liner.
3. Furnish #18-gauge perforated false bottom raised one inch above bin or pan bottom.
4. Furnish a one-inch drain and extend to floor sink.

## T. Wall Flashing:

1. Wall flashing shall be of #22-gauge affixed to wall with heavy duty, heat resistant adhesive.
2. Flashing shall be fabricated from maximum width sheets for minimum amount of vertical joints and shall be sealed with silicone and capped with hem strips without exposed screws or fasteners.
3. When wall flashing includes capping of wall ends, capping shall be fabricated from #18-gauge .

## U. Corner Guards and Wall Caps

1. Corner guards and wall caps shall be fabricated from #14-gauge stainless-steel.

## PART 3 – EXECUTION

## 3.0 Warranty

1. All equipment is to be covered by a 1-year warranty cover by the equipment supplier
2. All manufactured equipment it to be covered by a 2-year warranty for parts and labor which is to include overtime rates if needed. There shall be no pre-authorization for sending of the service company.
3. All custom equipment shall have a 1-year warranty on workmanship.

## 3.1 Installation Cleaning and Commissioning

1. All equipment shall be wiped clean upon initial completion of installation.
2. All equipment protected till such time that the commissioning of equipment is ready.

3. All equipment is to final polished with S/S polish.
4. Demonstrations of equipment scheduling shall be the responsibility of the supplier.

#### END OF DETAIL SECTION

#### Item 1 - SHELVING UNIT, T-BAR (5 REQ'D)

All welded T-bar style, 4 shelf unit, 60"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1067TB OR KELMAX

Correctional Package Tamper Proof

(1) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 72" x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 42" x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

#### Item 2 – BUN PAN RACK (8 REQ'D)

Universal Pan Rack, full height, open sides, universal stepped angle slides, slides on 6" centers, holds 10 pans, all-welded aluminum construction, front & rear loading, 69-1/4" high, 5" stem bolted casters. Pan Stop, mounted to rear, prevents accidental push through of pans. Push Handle, w/donut bumpers for racks. (KEC to Verify Fit into Roll-in Units)

Correctional Package Tamper Proof

Advance UR10 or Carter Hoffman or CresCor

#### Item 3 - SHELVING UNIT, T-BAR (1 REQ'D)

Dunnage Rack, 60"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Correctional Package Tamper Proof

New Age Model 2010 OR KELMAX



## Item 4 – WALK-IN COOLER/FREEZER (1 REQ'D)

23'-8" x 33'-7 1/2" x 9'-3 1/4" A.F.F. indoor "custom" L-shape, 5'-0"ID x 5'-2"ID misc frzr (w/flr), 6'-9"ID x 5'-2"ID misc co (w/flr), 10'-7"ID x 11'-0 1/2"ID frzr (w/flr), 21'-7"ID x 10'-11"ID co (w/flr), 4" Recess

Exterior finish EXPOSED AREAS: S/S Finish — Interior finish: STUCCO WHITE GALVALUME, 4" urethane NSF panels Connection to ceiling: CAMLOCK — Connection to floor: CAMLOCK — Ceiling caps: MOUNTED

FRAME: 4" urethane door section, 3-sided

LEAF: 4" thick, 3-sided, standard non-heated sweep,

**\*\*LEAF WILL NOT BE RAISED UNLESS SPECIFIED OTHERWISE\*\***

HARDWARE: (3) 1248 hinge, (1) 27C deadbolt handle, (1) 27C knob inside release, (1) 1094 closer

FINISH: 22 ga. 304 #4 (ext.) Where Exposed / Stucco white galvalume (int.) / 24 ga. 430 (magnetic) liners, w/ (1) ea. 14" x 14" non-heated view window, w/ (2) ea. 7 1/2" x 3" x 1 3/4" door anchor bracket, 1 ea. 34" x 79" flush model G3t self-closing cooler swing door (Left hinge), w/ (1) ea. Modular 75LC multi-monitor temperature alarm, w/ IP-1 illuminated push button, w/ (2) ea. 3/4" concealed PVC conduit w/ terminal J-box, Kick plates for (1) 34" x 79" flush model G3t door 36" high, .100 aluminum diamond tread (ext. leaf) / 36" high, .100 aluminum diamond tread (int. leaf) Lights: 2) - 4' LED light fixture w/ (2) LED lamps for Ea. cooler & freezer application (18W, 120V, .15A), CEILING TRIM: To be field fitted 304 #4

PLEASE NOTE ABOVE DESCRIPTION INFORMATION CARRIES ITEM# 9 INCLUSIVELY.

Refer to Manufacture Shop Drawings for coordinating information

Correctional Package

Imperial-Brown or ThermoKool or American Panel

## Item 4.1/4.2 – WALK-IN COOLER REFRIGERATION (1 REQ'D)

Large Cooler 12x22 - Outdoor R404a split system w/ QRC, 1-year refrigeration system labor warranty (Large Cooler 12x22), w/ liquid line assy. 208-230V/3ø/60Hz/1.5HP Hermetic compressor, MCA=15, MOPD =15, 37.75W x 28.25D x 17.25H x 230lbs. 13471 BTU/H @ 9.8°F TD with 13.9 hr runtime @ 35°F inside/85°F outside room, 95°F @ cond. unit, 498ft altitude. (1) Heatcraft R404a air cooled condensing unit #MOH015X63-LLA, w/ (2) EC motors (1.82A) & air defrost w/ mounted parts, 115V/1ø/60Hz, 45.5W x 14.84D x 14.94H x 45lbs. (1) Climate Control R404a low profile evaporator model #LSC070AEK-QRC, w/ (2) EC motors (1.82A) & air defrost, w/ mounted parts, 115V/1ø/60Hz, 45.5W x 14.84D x 14.94H x 45lbs.

(1) Climate Control R404a low profile evaporator model #LSC070AEK-QRC, 4-year extended compressor warranty (Large Cooler 12x22)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 4.3/4.4 – WALK-IN FREEZER REFRIGERATION (1 REQ'D)

Freezer 12x12 - Outdoor R404a split system w/ QRC, 1-year refrigeration system labor warranty (Freezer 12x12), w/ liquid line assy. 208-230V/3Ø/60Hz/3HP Hermetic compressor, MCA=15, MOPD =25, 37.75W x 28.25D x 19.75H x 260lbs. 9785 BTU/H @ 11.1°F TD with 16.4 hr runtime @ -10°F inside/85°F outside room, 95°F @ cond. unit, 498ft altitude. 1) Heatcraft R404a air cooled condensing unit #MOH031L63-LLA, w/ (2) EC motors (0.96A) & electric defrost (7.8A), w/ mounted parts, 208-230V/1Ø/60Hz, 45.5W x 14.84D x 14.94H x 48lbs. (1) Climate Control R404a low profile evaporator model #LSF090BEK-QRC, 4-year extended compressor warranty (Freezer 12x12)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 5 - SECURITY FLOOR TROUGH (3 REQ'D) 8" x 44"

14 gas all welded construction, perimeter channel edge at top with offset for grate, slope bottom to drain Provide integral 6" die box pattern sump drain(s) with removable s/s strainer basket and removable s/s strainer plate, 14 gas s/s sleeve welded to bottom of sump for attaching to building drain(s), Removable sash sectional bar grate - 1" x 3/16" flat bar, construction with 1/2" die s/s reinforcing rods, Use tamper resistant fasteners as required.

Correctional Package

SHOP DRAWINGS WITH ALL DETAILS TO BE SUBMITTED FOR APPROVAL.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 6 - SHELVING UNIT, T-BAR (3 REQ'D)

All welded T-bar style, 4 shelf unit, 60"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1067TB OR KELMAX

Correctional Package Tamper Proof

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 42" x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 7 - SHELVING UNIT, T-BAR (1 REQ'D)

Dunnage Rack, 42"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Correctional Package Tamper Proof

New Age Model 2064 OR KELMAX

Item 8 - SPARE NO.

Item 9 – WALK-IN COOLER/FREEZER (1 REQ'D)

PLEASE NOTE DESCRIPTION INFORMATION CARRIES WITHIN ITEM# 4 INCLUSIVELY.

Refer to Manufacture Shop Drawings for coordinating information

Correctional Package

Imperial-Brown or ThermoKool or American Panel

Item 9.1/9.2 – WALK-IN COOLER REFRIGERATION (1 REQ'D)

Misc Cooler - Outdoor R404a split system w/ QRC, 1-year refrigeration system labor warranty (Misc Cooler), w/ liquid line assy. 208-230V/1Ø/60Hz/0.5HP Hermetic compressor, MCA=15, MOPD =15 3.75W x 28.25D x 17.25H x 176lbs. (1) Heatcraft R404a air cooled condensing unit #MOH005X62-LLA, w/ (1) EC motors (0.91A) & air defrost, w/ mounted parts, 115V/1Ø/60Hz, 29.5W x 14.84D x 14.94H x 31lbs. (1) Climate Control R404a low profile evaporator model #LSC052AEK-QRC. 4-year extended compressor warranty (Misc Cooler)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 9.3/9.4 – WALK-IN FREEZER REFRIGERATION (1 REQ'D)

Misc Freezer - Outdoor R404a split system w/ QRC

3394 BTU/H @ 9.9°F TD with 17.4 hr runtime @ -10°F inside/85°F outside room, 95°F @ cond. unit, 498ft altitude, 1-year refrigeration system labor warranty (Misc Freezer) w/ liquid line assy. 208-230V/3Ø/60Hz/1HP Hermetic compressor. MCA=15, MOPD =15, 23.75W x 28.25D x 17.25H x 166lbs. (1) Heatcraft R404a air cooled condensing unit #MOH011L63-LLA, w/ (1) EC motors (0.48A) & electric defrost (3.9A), w/ mounted parts, 208-230V/1Ø/60Hz, 29.5W x 14.84D x 14.94H x 24lbs. (1) Climate Control R404a low profile evaporator model #LSF035BEK-QRC. 4-year extended compressor warranty (Misc Freezer)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 10 - SHELVING UNIT, T-BAR (1 REQ'D)

All welded T-bar style, 4 shelf unit, 60"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1067TB OR KELMAX

Correctional Package Tamper Proof

(1) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 48" x 20"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 11 - SHELVING UNIT, T-BAR (1 REQ'D)

All welded T-bar style, 4 shelf unit, 48"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1066TB OR KELMAX

Correctional Package Tamper Proof

(1) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 42" x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 12 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 60"W x 30"D, 14ga 304 top with heavy supports below, without backsplash, 18-gauge under shelf & stainless-steel legs & adjustable stainless-steel Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed

Stainless Innovations or South Jersey Metal or Carbone Fabrication

## Item 13 – CUSTOM WORKTABLE “L” Shaped (1 REQ'D)

Work Table, 14ga 304 top without backsplash, 18-gauge under shelf & legs & adjustable Flanged feet, all-welded construction, NSF. Length and shape as shown on plans. Underbody of S/S top to be full enclosed.

Correctional Package Tamper Proof

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 14 - SPARE NO.

## Item 15 - SHELVING UNIT, T-BAR (2 REQ'D)

Dunnage Rack, 48"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Correctional Package Tamper Proof

New Age Model 2009 OR KELMAX

Dunnage Rack, 60"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

## Item 16 – CAN STORAGE RACK (2 REQ'D)

Can Storage Rack, stationary design with adjustable feet, sloped glides for automatic can retrieval, aluminum construction, holds 162-#10 cans or 216-#5 cans, NSF

Correctional Package, Tamper Proof Screws.

New Age Model 1250 OR Deselect OR KAMAX

All New Age products are made in the USA, Lifetime warranty against rust & corrosion, 5-year construction warranty.

## Item 17 - SHELVING UNIT, T-BAR (6 REQ'D)

All welded T-bar style, 4 shelf unit, 72"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1068TB OR KELMAX

Correctional Package Tamper Proof

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 60" x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each, 48" x 20"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 18 - FOOD SLICER, ELECTRIC (2 REQ'D)

Manual Slicer, 13" dia. Precise Edge™ knife, top mounted knife sharpener, construction, gear-driven, antimicrobial protection, knife cover interlock, dual gear thickness adjustment, EZ-Glide™ system, open base design, ETL, NSF, 1/2 Hp, 115v/60/1, 7 amps, 2 year parts and 1 year labor warranty plus 15 years on the knife drive gears, standard, Correctional package, FACTORY INSTALLED, (pricing applies only at time of equipment purchase)

Globe Model 4600N or Hobart or Berkel

Item 19 – PREP TABLE W/2 COMPARTMENT SINK & WORKSINK

2 Compartment Prep Counter with 2) Sinks 22" x 18" x 12" & (1) Work Sink 20" x 18" x 12" Full welded 14Ga S/S top with Welded 18 Ga S/S Under shelf, W/ Cross rails below area of Sink. Length and shape to be as shown on plans. Backsplash needs to be enclosed at bottom and tight to wall. 6" high backsplash. Unit supplied with Flanged Feet. Flat section to be provided for Can opener.

Select Stainless or South Jersey Metal or Keas Fabrication

Accessories: 2) Krowne Metal 15-812L Royal Series Faucet, deck-mounted, 8" centers, swing spout, 12" long, 1/4 turn ceramic cartridge valve, NSF, CSA (Best), low lead compliant. 3) Krowne 22-404 Lever wastes.

Item 20 – MANUAL CAN OPENER (1 REQ'D)

Can Opener, manual, #1 with plated base (for cans up to 11" tall), "Old Reliable"

Edlund Model 1 or No Equal

## Item 21 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 96"W x 30"D, 14ga 304 top with heavy supports below, without backsplash, 18-gauge stainless-steel under shelf & stainless-steel legs & adjustable Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed

Stainless Innovations or South Jersey Metal or Carbone Fabrication

## Item 22 - FOOD MIXER (1 REQ'D),

Planetary Mixer, floor model, 30 qt. 304 bowl, #12 attachment hub, (3) fixed-speeds, digital controls with 60- minute timer & batch recall, permanently lubricated gear-driven transmission, removable bowl guard with built-in ingredient chute, interlocking bowl lift, thermal overload protection, cast iron body with enamel gray paint, non-slip rubber feet, includes: wire whip, aluminum spiral dough hook, & flat beater, 1 HP, 120/60/1-ph, 16.0 amps, 3-wire cord with NEMA 15-20L, cETL us, NSF

Correctional Package

Globe Model SP30 or Hobart or Berkel

2 year parts (excludes wear/expendable parts), Correctional Package, FACTORY INSTALLED (pricing applies only at time of equipment purchase), Bowl Truck, heavy-duty, for SP30 30 quart mixer.

Item 23- SPARE NO.

## Item 24 – SINK, HAND (2 REQ'D)

Hand Sink, 17" x 15" OA, wall mount with bracket, 14" x 10" front-to-back x 6" deep, splash mount gooseneck spout operated with foot pedals, 1-1/2" drain, soap dispenser, stainless-steel construction, NSF

Correctional Package Tamper Proof

Krowne Metal Model HS-14 - \*UPGRADE\* Low Lead Commercial Faucet Upgrade 2 ea.

Side Splashes for hand sink, pair 2 ea.

## Item 25 - ICE MACHINE (1 REQ'D)

Ice Maker, Cube-Style, 30"W, air-cooled, self-contained condenser, production capacity up to 1087 lb/24 hours at 70°/50° (935 lb AHRI certified at 90°/70°), finish, crescent cube style, R-404A refrigerant, 208-230v/60/1-ph, 12.5 amps, NSF, UL.

## Correctional Package

Hoshizaki Model KM-1100MAJ or Manitowoc or Scotsman

Tamper Proof Kit, 30" W x 32-1/2" D, front panel, tamper proof Torx® fasteners, (2) Torx® bits, perforated air vents for 30" W air-cooled machines

## Item 25.1 – Filter System (1 REQ'D)

Everpure® High Flow CSR Triple-XCLM+ Fountain Filtration System, 3-6 gpm flow rate, rated capacity 27,900 to 57,900 gallons, chloramines reduction, NSF

Everpure Model EV976133

## Item 26 - ICE BIN (1 REQ'D)

Ice Bin, 52"W, top-hinged front-opening door, 900-lb ice storage capacity, for top-mounted ice makers, exterior, painted legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL, ETL-Sanitation Correctional Package

Hoshizaki Model B-900SF or Manitowoc or Scotsman

## Item 27 - SECURITY FLOOR TROUGH (1 REQ'D) 12" x 50"

Floor Trough, 12" x 50", grate & removable basket, 14GA. , NSF

Correctional Package supplied with Key tool to remove grates.

SHOP DRAWINGS WITH ALL DETAILS TO BE SUBMITTED FOR APPROVAL.

Stainless Innovations or South Jersey Metal or IMC Teddy

## Item 28– SINK HEATER

Sink Heater, electric, under sink design, electric operation, front, for over 21" square sink area, 9.0 kW, NSF, cUL us, Made in USA. 480v/50/60/3-ph (Not for retrofit), Security package (Torx® screws and control cover) (Not for retrofit)

Correctional Package

Hatco Model no. 3CS-9 or Hubbell or Allpoints



## Item 29– PRE-RINSE FAUCET

Krowne Royal Series, pre-rinse Assembly, with add-on faucet, wall mount, 8" centers, spring action flexible gooseneck, 38"H hose with 15" overhang & 1.2 GPM spray head, built in check valves, 2.0 GPM add-on faucet with 12" swing spout, quarter-turn ceramic cartridge valves, includes wall bracket & mounting kit, chrome plated brass base, low lead compliant, includes internal check valves to prevent backflow and cross contamination, NSF (interchangeable with most brands) (ships pre-assembled) Correctional Package

KROWNE Model no. 17-109WL or Fisher Faucet or T&S Brass

## Item 30– SPLASH MOUNT FAUCET

Krowne Royal Series Faucet, splash-mounted, 8" centers, 14" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, NSF, Includes internal check valves to prevent backflow and cross contamination.

Correctional Package

KROWNE Model no. 14-814L or Fisher Faucet or T&S Brass

## Item 31 – 3 COMPARTMENT SINK

3 Compartment sink w/ 3 Compartment Sink W/ 2) 22" x 28" Sinks and 1) 26" x 28" All 14" deep. Length and shape as shown on plans. Legs to be removable and will get welded to gusset in field. 8" high Backsplash, 2) 8" o.c. holes for splash mounted faucets. Supplied with flanged feet. 14ga S/S top 304. W/fully welded Cross rails at sides and front. Sanitize Sink to receive Item No. 28 Sink Heater

Stainless Innovations or South Jersey Metal or Carbone Fabricators

## Item 32 – TRAY DRYING RACK

Tray-Drying Rack, mobile, 3 tray levels, (40) 18" x 26" trays per level, 1.4" angle spacing, heavy duty aluminum construction, (4) 5" platform casters, KD, NSF, Caster Lock, for 5" platform caster

Correctional Package

New Age Model 1067TB OR Kelmax

## Item 33 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 60"W x 30"D, 14ga 304 stainless-steel top with heavy supports below, with 6" backsplash, 18-gauge under shelf & stainless-steel legs & adjustable stainless-steel Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed. Unit to "Z" Clip to wall.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 34 - SPARE NO.

Item 35 - HEATED CABINET, ROLL-IN (2 REQ'D)

Designer Line Warmer, roll-in, two-section, front, aluminum interior & ends, standard depth cabinet, full-height solid doors, electronic control with digital display, hi-low alarm, cETLus, NSF, Made in USA Correctional Package

Continental Refrigeration Model DL2WI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One way security screws, Locking hasp (lock not included), mesh security cover, Coverless hinges

Item 36 - REFRIGERATOR, ROLL-IN (3 REQ'D)

Designer Line Refrigerator, roll-in, two-section, self-contained refrigeration, stainless-steel front, aluminum interior & ends, standard depth cabinet, full-height solid doors, electronic control with digital display, hi-low alarm, removable stainless-steel ramps, 1/2 HP Correctional Package

Continental Refrigeration Model DL2RI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One-way security screws, Locking hasp (lock not included), Stainless-steel mesh security cover, Coverless hinges

Item 37 - FREEZER, ROLL-IN (1 REQ'D)

Designer Line Freezer, roll-in, two-section, self-contained refrigeration, stainless-steel front, aluminum interior & ends, standard depth cabinet, full-height solid doors, electronic control with digital display, hi-low alarm, removable ramps, 1 HP, Correctional Package

Continental Refrigeration Model DL2FI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One-way security screws, Locking hasp (lock not included), mesh security cover, Coverless hinges

## Item 38 -Chef's Counter (1 REQ'D)

14 gauge stainless-steel top w/ 10" chamfer edges. 1-1/2" x 1-1/2" x 1/8" galv. angle frame & reinforcement, 18 ga. Stainless-steel body panels, 6" high with flanged feet., Provide a 12" x 14" x 12" - 14 ga. Stainless-steel integral welded sink, One (1) lever waste drain with overflow and handle bracket. Length and shape as shown on plans.

Sink area shall be a cabinet section with fully welded curb base. Base shall notch out for floor sink. Access to cabinet shall be through full body length double pan access panel held in place with fitted security screws. Screws shall not be removable from panel section. Cabinet section shall be approximately 24" wide by the depth of the counter.

Stainless Innovations or South Jersey Metal or Carbone Fabricators

Accessories: Krowne 15-801 Royal Series Faucet, deck-mounted, 8" centers, gooseneck

## Item 39 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 96"W x 30"D, 14ga 304 top with heavy supports below, without backsplash, 18-gauge under shelf & stainless-steel legs & adjustable stainless-steel Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed

Stainless Innovations or South Jersey Metal or Carbone Fabrication

## Item 40– EXHAUST HOOD W/MAKE-UP AIR SUPPLIED WITH FAN UNITS

6030ND-2-PSP-F - 11ft-0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff, 100% 430 SS, Fire Cabinet Wall Mounted 12.00" Width x 60.00" Length x 30.00" Height, FILTER - 20" tall x 16" ( 19.625" by 15.625") wide Stainless-Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17.

12" x 12" Recessed LED Light, 3K warm output. EXHAUST RISER - Factory installed 10" X 24" X 4", SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers, 1/2 Pint Grease Cup New Style, Flanged Slotted, BACK STANDOFF (FLAT) 12" Wide 132" Long, Prison Package - Replacement hood screws, Prison Package - Burglar Bars in Exhaust Riser, Prison Package - Lockable Filters.

Hood #2 - Job #3871812

6030ND-2-PSP-F - 11ft 0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff, 100% 430 SS, FILTER - 20" tall x 16" ( 19.625" by 15.625") wide

Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17. 12" x 12" Recessed LED Light, 3K warm output. EXHAUST RISER - Factory installed 10" X 24" X 4", SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers, 1/2 Pint Grease Cup New Style, Flanged Slotted, BACK STANDOFF (FLAT) 12" Wide 132" Long, Prison Package - Replacement hood screws, Prison Package - Burglar Bars in Exhaust Riser, Prison Package - Lockable Filters.

Fire System #1 - Job #3871812

ANSUL-3.0/3.0/3.0/3.0-WC Ansul 12 gallon Fire System in Wall Mounted Utility Cabinet (includes pre-piped hood(s) with detection, tank(s), release mechanism, microswitches and pull station).

Includes piping for hoods: 1, 2, 3, 4.

- GAS VALVE - 2" Mechanical Shutoff Valve (Ansul)(28-55610) - Includes Upstream Strainer assembly; SUPPLIED BY DISTRIBUTOR.

Fan #1 USBI36DD-RM-S - Exhaust Fan - Job #3871812

USBI36DD-RM Direct Drive Exhaust Only Unit With 37.250" Steel Wheel. Utility Set Exhaust Fan w/ 2" Grease Drain. Clockwise Rotation When Looking At Inlet. Exhaust Fan handles 10400 CFM @ -2.000" wc ESP, Fan runs at 727 RPM. EXHAUST Motor: 15.000 HP, 3 Phs, 208 V, 60Hz, 42.3 FLA, ODP, Premium (E-Plus3) Eff. - BI - Discharge Orientation - Vertical Upper Left - CW Looking At Inlet. Grease Cup for Utility Sets. Option for Utility Sets. BI36 - Rain Cap Assembly. BI36 - Inlet Ring. Floor Mount Spring Vibration Isolators. Option for the BI33 thru BI36, USBI36 (6 required) Utility Set units. Max Weight = 260 lbs. 1" Deflection. 3/8" bolt diameter. (5C129 X 6). "Yellow" (5C129) - Mason C-A-310. - Curb RAILS-BI30-36 12H( Set of 2 ) On Fan #1 Flat Curb.

Fan #2 A4-D.1000-30D - Heater - Job #3871812

A4-D.1000-30D Direct Gas Fired Heated Make Up Air Unit with 30" Direct Drive Fan and 24" Burner.

Supply Fan handles 8800 CFM @ 1.000" wc ESP, Fan runs at 1098 RPM. Heater supplies 643978 BTUs. 70°F Temperature Rise. [Fuel: Natural Gas]. Supply Motor: 7.500 HP, 3 Phase, 208 V, 60Hz, 22.3 FLA, ODP, Premium (E-Plus3) Eff.

Down Discharge - Air Flow Right -> Left - Sloped Filtered Intake for Size #4 Modular Direct Fired Make-Up Air Units. 45.81" Wide x 70.05" Long x 44.00" High. Includes 2" MV EZ Kleen Metal Mesh Filter.

Maxitrol 14 • 40-80°F Discharge Temp Control - Gas Manifold for DF4 GM - BTU 0 - 1100000 - 7 in. w.c. - 14 in. w.c., No Insurance Requirement (ANSI), BV250-1010 - Cooling Interlock Relay. 24VAC Coil. 120V Contacts. Locks out burner circuit when AC is energized. - Motorized Back Draft Damper 34" X 36" for Size 4 Standard & Modular Heater Units w/Extended Shaft, Standard Galvanized Construction, 3/4" Rear Flange, Low Leakage, NFBUP-S Actuator Included, - Low Fire Start.

Allows the burner circuit to energize when the modulation control is in a low fire position. - Gas Pressure Gauge, 0-35", 2.5" Diameter, 1/4" Thread Size, - Gas Pressure Gauge, -5 to +15 Inches Wc., 2.5" Diameter, 1/4" Thread Size, - Separate 120VAC Wiring Package for Make-Up Air Units. Option must be selected when mounting VFD in prewire panel or with DCV package. Provides separate 120VAC input to supply fan. This 120V signal must be run by electrician from DCV to mua switch. - Curb CRB42x20INS Insulated On Fan #2 Flat Curb - Rail RAIL-42" x 6" x 20"H On Fan #2

#### Electrical System #1 - Job #3871812

DCV-1111 Demand Control Ventilation, w/ control for 1 Exhaust Fan, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire, Fans modulate based on duct temperature. INVERTER DUTY 3 PHASE MOTOR REQUIRED FOR USE WITH VFD. Room temperature sensor shipped loose for field installation. Verify distance between VFD and Motor; additional cost could apply if distance exceeds 50 feet. Includes 4 Duct Thermostat kits. - 15.000 HP 3 phs 208 V Upgrade, - ESV552N02TXB571 - Variable Frequency Drive - 7-1/2 HP Max., 200/240 V, Three Phase, 23.0 A Max., NEMA 1 Enclosure, with 2RJ-45 FOR MODBUS, - ESV153N02TXB571 - Variable Frequency Drive - 20 HP Max., 200/240 V, Three Phase, 54.0 A Max., NEMA 1 Enclosure, (Default is Shipped Loose for Field Installation)

PART NEEDS PROGRAMMING - VERIZON CELLULAR KIT, WIRED ANTENNA AND VERIZON DATA FOR 1 YEARS. - PSP thermostat kit, includes 1x duct thermostat, quick seal, and j-box for monitoring of PSP discharge temperature. - Digital Prewire Lighting Relay Kit. Includes hood lighting relay & terminal blocks. Allows for up to 1400W of lighting each. - CAT-5E CABLE - 50 Foot. UV rated. - Thermistor CABLE - 18/2 AWG GREEN WHITE, plenum rated. USED for thermistor duct stat. Per Foot Price. - CAT-5E CABLE - 50 Foot. UV rated.

#### CASLink Monitoring

#### DUCTING SYSTEM

Shall consisted of the enclosed or a variation of such based-on coordination of duct run with the architect / engineers drawings. Final needs may vary at no additional cost to Owner. All Information enclosed is subject to change and requires KEC coordination.

#### Duct Run #1

(RC1) DW22DWRISER-3R-S Double Wall Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (RC2) DW22DWRISER-3R-S Double Wall Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (RC3) DW22DWRISER-3R-S Double Wall Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (RC4) DW22DWRISER-3R-S Double Wall

Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (P1)

DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P2) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P3) DW16DWACCDORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 22" Outer Shell. (P4)

DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Outer Shell. (P5) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Outer Shell. (P6) DW20DWYTEASY-3R-S Double Wall Duct - 20" Inner Y Tee Duct - 3 Layers Reduced Clearance - 26" Outer Shell. (P7)

DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Outer Shell. (P8) DW2047DWAJD-3R-S Double Wall Adjustable Duct - 20" Inner Duct, 47" long - 3 Layers Reduced Clearance - 26" Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P9)

DW2630SADKIT Duct - Horizontal Saddle Support Kit, Used With 26" OD - Includes Uni-Strut Cut To Length, DW2630SAD, & Hardware Bag 4. (P10) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Outer Shell. (P11) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P12) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P13) DW16DWACCDORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 22" Outer Shell. (P14) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Outer Shell.

(P15) DW2024DWRNDADPEC3ASY-3R-S Double Wall Duct - 20" X 24" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 26" X 30" Outer Shell. (P16) DW2427DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 27" long - 3 Layers Reduced Clearance - 30" Outer Shell. Min Length = 11" / Max Length = 24.5" / Adjustment = 13.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P17) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P18) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P19) DW16DWACCDORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 22" Outer Shell. (P20) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Outer Shell. (P21) DW2047DWAJD-3R-S Double Wall Adjustable Duct - 20" Inner Duct, 47" long - 3 Layers Reduced Clearance - 26" Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P22)

DW2630SADKIT Duct - Horizontal Saddle Support Kit, Used With 26" OD - Includes Uni-Strut Cut To Length, DW2630SAD, & Hardware Bag 4. (P23) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P24) DW20DWYTEASY-3R-S

Double Wall Duct - 20" Inner Y Tee Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P25) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P26) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Stainless-Steel Outer Shell. (P27) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P28) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P29) DW16DWACCDORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover with Clamps - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P30) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P31) DW2024DWRNDADPEC3ASY-3R-S Double Wall Duct - 20" X 24" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 26" X 30" Stainless-Steel Outer Shell.

(P32) DW2427DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 27" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. Min Length = 11" / Max Length = 24.5" / Adjustment = 13.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P33) DW24DWYTEASY-3R-S Double Wall Duct - 24" Inner Y Tee Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P34) DW24DWTEASY-3R-S Double Wall Duct - 24" Inner Tee Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P35) DW24DWACCDORCOV-3R-S Double Wall Duct - 24" Inner Access Door & 30" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P36) DW2435DWLT-3R-S Double Wall Duct - 24" Inner Duct, 35" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell.

(P37) DW2447DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 47" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P38) DW2490DWASY-3R-S Double Wall Duct - 24" Inner 90 Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P39) DW24DWTEASY-3R-S Double Wall Duct - 24" Inner Tee Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P40) DW2435DWLT-3R-S Double Wall Duct - 24" Inner Duct, 35" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P41) DW2447DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 47" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P42) DW24DWACCDORCOV-3R-S Double Wall Duct - 24" Inner Access Door & 30" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. 3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. DW16DWCLASY-3R-S Duct - 16" Duct - 22" Double "V" Clamp - 3R Insulation & Single "V" Clamp Included - Reduced Clearance. DW20DWCLASY-3R-S Duct - 20" Duct - 26" Double "V" Clamp - 3R Insulation & Single "V" Clamp Included - Reduced Clearance. DW24DWCLASY-3R-S Duct - 24" Duct - 30" Double "V" Clamp - 3R Insulation & Single "V" Clamp Included - Reduced Clearance.

MAKE-UP AIR DUCT WORK SHALL BE INCLUDED UNDER 11400To be coordinated with architect / engineer drawings.

Correctional Package

Captive Air Systems or Gaylord or Caddy Air

## Item 41 - SECURITY FLOOR TROUGH (2 REQ'D) 108" x 24" x 6"

ASFT Anti-Spill Floor Trough, 108"W x 24"D, 6" deep receptacle, (2) 4" OD tailpieces, stainless-steel beehive strainer, 14/304 stainless-steel, brushed satin finish, (SG) subway grating, NSF, Made in USA.

Correctional Package

SHOP DRAWINGS WITH ALL DETAILS TO BE SUBMITTED FOR APPROVAL.

IMC TEDDY Model ASFT-24108-SG or South Jersey Metal or Stainless Innovations

## Item 42 - 40 Gal. TILTING SKILLET ( 2 REQ'D)

Tilting Skillet, gas, 40 gallon capacity, manual tilt, electronic ignition, crank tilt with self-locking positive stop, removable lip strainer, stainless-steel construction, open leg frame base, adjustable feet front, adjustable flanged feet rear, 100,000 BTU, CSA-Star, CSA-Flame, NSF Correctional Package

Crown Model GTS-40 or Groen or Market Forge

ACCESSORIES: Standard two year limited warranty, Natural Gas, 115v/50/60/1-ph, standard, 12" single pantry faucet, Correctional screws & tack welds , S/S hinged cover over control panel w/locking provisions GMS-30 Permanent etched interior markings, for 30 gallon braising pan (specify gallon or liter markings) PC-3 Pan Carrier, SF-12 12" single pantry faucet,

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1" inside dia., 48" long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity.

6030ND-2-PSP-F - 11ft 0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff - 100% 430 SS - FILTER - 20" tall x 16" ( 19.625" by 15.625") wide Stainless-Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17. - 12" x 12" Recessed LED Light, 3K warm output. - EXHAUST RISER - Factory installed 10" X 24" X 4" - SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers - 1/2 Pint Grease Cup New Style, Flanged Slotted - Prison



Package - Replacement hood screws - Prison Package - Burglar Bars in Exhaust Riser - Prison Package - Lockable Filters

#### DUCTING SYSTEM

Shall consisted of the enclosed or a variation of such based on coordination of duct run with the architect / engineers drawings. Final needs may vary at no additional cost to Owner. (P1) DW1645ASY Single Wall Duct 45 Degree Elbow, 16" Duct, Assembly.

(P2) DW1622ADP Single Wall Duct Adapter, 16" Duct Dia to 22" Duct Dia, Standard Part. (P3) DW22TEASY Single Wall Duct Tee, 22" Duct, Assembly. (P4) DW22TEASY Single Wall Duct Tee, 22" Duct, Assembly. (P5) DW2290ASY Single Wall Duct 90 Degree Elbow, 22" Duct, Assembly. (P6) DW22455LT Single Wall Duct 22" diameter, 45.5" long, flange at both ends. Stainless-Steel. (P7) DW2260AJDKIT Single Wall Duct Adjustable, 22" diameter, 59.5" long, flange at one end with a 22" Diameter - 4" Tall - Adjustable Collar – Stainless-Steel. (P8) DW3122TP Duct to Curb Transition, 31-1/2" Curb to 22" Duct, 16 GA Aluminized. Used on BDU24. (P9) DW2223ADKIT Duct Access Door with Handle & Grease Dam, for 22" duct use 23" door. Stainless-Steel. (P10) DW1622ADP Single Wall Duct Adapter, 16" Duct Dia to 22" Duct Dia, Standard Part. (P11) DW164125LT Single Wall Duct 16" diameter, 41.25" long, flange at both ends. Stainless-Steel. (P12) DW1648AJDKIT Single Wall Duct Adjustable, 16" diameter, 47.5" long, flange at one end with a 16" Adjustable Collar – Stainless-Steel. (P13) DW16SUBRASY Duct Support Bracket Assembly, 16" Duct, Used for Hanging Duct. 12 GA Steel, Clear Zinc Coating. - 2 Rings, 4 Brackets Plus Hardware. (P14) DW16SUBRASY Duct Support Bracket Assembly, 16" Duct, Used for Hanging Duct. 12 GA Steel, Clear Zinc Coating. - 2 Rings, 4 Brackets Plus Hardware. (P15) DW16SUBRASY Duct Support Bracket Assembly, 16" Duct, Used for Hanging Duct. 12 GA Steel, Clear Zinc Coating. - 2 Rings, 4 Brackets Plus Hardware. (P16) DW16TEASY Single Wall Duct Tee, 16" Duct, Assembly. (P17) DW16085LT Single Wall Duct 16" diameter, 8.500" long, flange at both ends. Stainless-Steel. (P18) DW1615AJDKIT Single Wall Duct Adjustable, 16" diameter, 15" long, flange at one end With a 16" Adjustable Collar – Stainless-Steel. (P19) DW1645ASY Single Wall Duct 45 Degree Elbow, 16" Duct, Assembly. (P20) DW1617ADKIT Duct Access Door with Handle & Grease Dam, for 16" duct use 17" door. Stainless-Steel. (P21) DW1213ADKIT Duct Access Door with Handle & Grease Dam, for 12" duct use 13" door. Stainless-Steel. 3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. DW12CLASY Duct "V" Clamp With new design 14 Ga Brackets, 12" Duct, Assembly. DW16CLASY Duct "V" Clamp With new design 14 Ga Brackets, 16" Duct, Assembly. DW22CLASY Duct "V" Clamp With new design 14 Ga Brackets, 22" Duct, Assembly. Service Design Verification Building Surcharge, Service Design, Verification for CASLink Ethernet. Service Design Verification for Demand Control Ventilation. Service Design Verification for Direct Fired Heater. Service Design Verification for Exhaust Fan. Service Design Verification for Hood. Service Design Verification for Modular Package Unit.

MAKE-UP AIR DUCT WORK SHALL BE INCLUDED UNDER 11400

To be coordinated with architect / engineer drawings.

Correctional Package

Captive Air Systems or Gaylord or Caddy Air

Item 48 – CONVECTION OVEN (3 REQ'D)

Silver Star Convection Oven, gas, double-deck, cook-&-hold, deep oven, solid state controls, stainless-steel front, top & sides, aluminized steel rear, interior light, 6" stainless-steel legs, 144,000 BTU, 120v/60/1-ph, NEMA 5-15P, (2) 1/2 HP, CSA, NSF, 2 year parts & labor, 5 years warranty on doors (parts only, excluding door glass), (2) 120v/60/1-ph, 7.9 amps, NEMA 5-15P,

Correctional Package

Southbend Model SLGS/22SC or Blodgett DFG-200 DBI or Imperial Heavy Duty

Accessories: 6" Casters in lieu of legs, Stainless-steel drip pan, Expanded metal on flue/vent, Correctional fasteners, Door locking clasp, Secured light cover, Control panel cover, Top & bottom enclosure for rear jacket.

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1" inside dia., 48" long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity.

Item 49 – CONVECTION STEAMER (1 REQ'D)

Convection Steamer, gas, (2) compartments, (7) pan capacity total, manual controls, electronic ignition, Delime mode & automatic blow down, single drain with temperature control, split water connections, includes water filter system, stainless-steel interior, exterior & cabinet base, 6" legs, adjustable bullet feet front, flanged feet rear, 140,000 BTU, CSA Star, CSA Flame, NSF Correctional Package

Crown GXS-7HE or Groen Smart Steam or Market Forge

Accessories: Stainless-steel hinged cover over control panel, Cabinet base doors with locking provisions, Correctional screws & tack welds.

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1" inside dia., 48" long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity.

## Item 50 –HEAVY DUTY RANGE (2 REQ'D)

Platinum Heavy Duty Range, gas, 36", (4) 45,000 BTU open burners, manual controls, (1) convection oven, includes (3) racks, stainless-steel front, sides, rear, exterior bottom & 6" adjustable legs, 225,000 BTU, CSA, NSF (Note: Qualifies for Southbend's Service First™ Program, see Service First document for details) Correctional Package

Southbend Model P36A-XX or Montague Heavy Duty or Jade Range (Heavy Duty)

Standard (2) years limited parts and labor warranty

Accessories: NOTE: 5" flue riser, Natural Gas, Bolt-down/flanged feet in lieu of std. legs, Correctional fasteners, Door locking clasp, Knob control, Control panel cover (oven base only),

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1" inside dia., 48" long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity

## Item 58 – INMATE TRAY DELIVERY CART (3 REQ'D)

Heated cabinet to hold, 72- 10x14 serving trays with 3in spacing between each row. Cabinet to hold (4) 18x26 serving Trays with 6in spacing between each. Also to have securable pull out drawer with perforated top for ice packs ( not supplied ). Cabinet also will have holder for 3- 4.5gal. Cambro drink containers (Cambros by other), Both cabinets to have correctional package. All interior metal to be 20ga s/s. All exterior metal to be 18ga s/s. Unit to have (4)-5 in swivel casters & perimeter bumper.

SecoSelect Model CMP-CCJ-80 or Stainless Innovations or Keas Fabrication

## Item 59 – TRAY DRYING RACK (3 Required)

Tray-Drying Rack, mobile, 3 tray levels, (40) 18" x 26" trays per level, 1.4" angle spacing, heavy duty aluminum construction, (4) 5" platform casters, KD, NSF, Caster Lock, for 5" platform caster

Correctional Package

New Age Model 1067TB OR Kelmax

## Item 60 – SOILED DISHTABLE

Soiled Dish table W/Pre-rinse Sink 20" x 20" x 5" deep. Length and shape as shown on plans. Welded Bridge Bars for Racks guides. Legs to be removable and will get welded to gusset in field. 8" high

Backsplash to be enclosed at bottom to wall, to "Z" Clip to wall, Supplied with Flanged Feet. 14ga. S/S top Fully Welded Cross rails. Unit supplied with Flanged Feet.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Accessories: Krowne Metal 17-108WL Royal Series Pre-Rinse Assembly with Wall Bracket, Wall-Mounted, 8" Centers, Spring Action Flexible Gooseneck, 35" High with 15" Overhang, 1/2" NPT Female Inlets, 1.2GPM spray head, chrome plated brass base, built in check valves. Krowne Metal 22-404 Lever Waste Drain

#### Item 61 - DISHWASHER, DOOR HOOD TYPE (1 REQ'D)

Pro Series, 66"W rack conveyor dishwasher, with 22" pre-wash, Vent-less Heat Recovery technology, Proportional Rinse, Progressive anti-jam drive system, top mounted Prodigy series HMI user interface, Proactive maintenance software, 100 gallons per hour with energy sentinel (idle pump shut-off), (209) racks per hour, built-in 70° rise booster, electric tank heat, single-piece hood design, single-piece stainless-steel upper & lower wash arms manifolds, internal removable scrap basket & dual-piece scrap screens, 20" standard vertical clearance which accommodate 18" x 26" sheet pans, full 90° opening leak proof insulated hinged access doors, automatic tank fill, door safety switches, leak-proof ball valve drains, lower front & side enclosure panels, heavy gauge construction including base & legs, electric tank heat, 2 HP wash pump, single point machine & separate booster connection, vent fan control, rear manifolds, NSF, CULus, Made in USA (consult factory for price)

Champion Model 66-PRO-VHR OR HOBART OR Miekco

#### Item 62– CLEAN DISHTABLE

Custom fabricated 'L' shaped clean table 8'-7" long x 6'-7" long x 2'-6" wide x 2'-10" high. Refer to manufacturer's drawings for additional information. 8" high Backsplash with enclosed lower area to wall, to "Z" Clip to wall, Supplied with Flanged Feet. 14ga. S/S top, with fully welded cross rails on base.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

#### Item 63 – SHADOW BOX (1 REQ'D)

Wall Cabinet - Security Shadow Box approx. 42" x 15" x 36" high – stainless-steel body, and shelving – Top to slope down 4" to 24" height in front – stainless-steel hinged doors with wire mesh welded inside – doors to have cylinder locks, Peg Board mounted inside cabinet with U shaped holders (15). Use tamper resistant fasteners as required (Not Shown On Plan, Size & Location to be Verified within Office)

Stainless Innovation or South Jersey Metal or Carbone Fabrication

Item 64 – WASH DOWN STATION (1 REQ'D)

Washdown Faucet, wall mount, with recessed cabinet, 3/4" mixing valve, stainless-steel thermometer, 50' hose, rear trigger stainless-steel water gun & hose rack. Correctional Package

KEC to coordinate with field on location and recess for control Cabinet.

T&S BRASS Model MV-07771-12R or SMT or Fisher Faucet

END OF SECTION 114000

## SECTION 122113 - HORIZONTAL LOUVER BLINDS

## 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. Horizontal louver blinds with aluminum slats.
- B. Related Requirements:
  - 1. Section 061053 - "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting horizontal louver blinds and accessories.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for horizontal louver blinds.
- C. Samples for Initial Selection: For each type and color of horizontal louver blind.
  - 1. Include similar Samples of accessories involving color selection.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of horizontal louver blind.
- B. Product Test Reports: For each type of horizontal louver blind, for tests performed by manufacturer and witnessed by a qualified testing agency.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

### 2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
  - 1. Hunter Douglas Contract.
  - 2. Levolor Contract; a Newell Rubbermaid company.
  - 3. Springs Window Fashions.
- B. Location: All administrative including offices, conference rooms, training room, break room, and waiting areas with exterior windows.
- C. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.
  - 1. Width: 1-inch.
  - 2. Thickness: Manufacturer's standard.
  - 3. Spacing: Manufacturer's standard.
  - 4. Finish: Ionized antistatic, dust-repellent, baked polyester finish.

- D. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.
  - 1. Capacity: One blind per headrail unless otherwise indicated.
  - 2. Ends: Manufacturer's standard.
  - 3. Manual Lift Mechanism:
    - a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.
    - b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
  - 4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
    - a. Tilt: Full.
    - b. Operator: Clear-plastic wand.
    - c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.
  - 5. Manual Lift-Operator and Tilt-Operator Lengths: Full length of blind when blind is fully closed.
  - 6. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.
  - 7. Integrated Headrail/Valance: Curved face.
- E. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.
  - 1. Type: Manufacturer's standard.
- F. Lift Cords: Manufacturer's standard braided cord.
- G. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
  - 1. Type: Braided cord.
- H. Valance: Manufacturer's standard.
- I. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
  - 1. Type: End Mount.
  - 2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- J. Colors, Textures, Patterns, and Gloss:
  - 1. Slats: As selected by Architect from manufacturer's full range.



2. Components: Provide cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

## 2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
  1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8-inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4-inch, plus or minus 1/8-inch.
- C. Concealed Components: Non-corrodible or corrosion-resistant-coated materials.
  1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
- F. Color-Coated Finish:
  1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
  1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install horizontal louver blinds in all exterior windows except in Locker/Restrooms where there is obscure glazing.
- B. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
  - 1. Locate so exterior slat edges are not closer 2-inches from interior faces of glass and not closer than 1-inch from interior faces of glazing frames through full operating ranges of blinds.
  - 2. Install mounting and intermediate brackets to prevent deflection of headrails.
  - 3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

### 3.3 ADJUSTING

- A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

### 3.4 CLEANING AND PROTECTION

- A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer and that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 122113

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## SECTION 123216 - MANUFACTURED PLASTIC-LAMINATE-FACED CASEWORK

## 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. Plastic-laminate-faced cabinets of stock design.
  - 2. Plastic laminate slotted mail sorter.
- B. Related Requirements:
  - 1. Section 061053 - "Miscellaneous Rough Carpentry" for wood blocking for anchoring casework.
  - 2. Section 092216 - "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
  - 3. Section 096513 - "Resilient Base and Accessories" for resilient base applied to plastic-laminate-faced casework.
  - 4. Section 123661 - "Solid Surfacing Countertops and Window Sills" for countertops and window sills.

## 1.3 DEFINITIONS

- A. Definitions in the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" apply to the work of this Section.
- B. MDF: Medium-density fiberboard.
- C. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.

## 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Keying Conference: Conduct conference at Project site Incorporate keying conference decisions into final keying requirements.

## 1.5 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication details, including types and locations of hardware. Show installation details, including field joints and filler panels. Indicate manufacturer's catalog numbers for casework.
- C. Samples: For cabinet finishes.
- D. Samples for Initial Selection: For cabinet finishes.
- E. Samples for Verification: 8-by-10-inch samples for each type of finish.

## 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.
- C. Sample Warranty: For special warranty.

## 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

## 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period. Maintain temperature and relative humidity during the remainder of the construction period in range recommended for Project location by the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards".
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

## 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Delamination of components or other failures of glue bond.
    - b. Warping of components.
    - c. Failure of operating hardware.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide casework by one of the following:
  - 1. Cal-Dak Cabinets;
  - 2. CampbellRhea.
  - 3. Diversified Fixture.
  - 4. Hausmann Industries, Inc.
  - 5. LSI Corporation of America; a Sagas International Company.
  - 6. R.C. Smith Company.
  - 7. Stevens Industries, Inc.
  - 8. Techline USA, LLC.
  - 9. TMI Systems Design Corporation.

## B. Source Limitations:

1. Obtain plastic-laminate-faced cabinets from single manufacturer.
2. FSC Certified wood components.
3. No Added Urea Formaldehyde (NAUF) in materials or fabrication.

## 2.2 CASEWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
1. Grade: Custom.
  2. Provide Certificates from AWI certification program indicating that casework complies with requirements of grades specified.
- B. Product Designations: Drawings indicate sizes, configurations, and finish materials of manufactured plastic-laminate-faced cabinets by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."
- C. Product Designations: Drawings indicate configurations of manufactured plastic-laminate-faced cabinets by referencing designations of Casework Design Series numbering system in Appendix A of the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards".

## 2.3 CASEWORK

- A. Design:
1. Reveal overlay, with doors and drawer fronts overlapping case front with minimum reveal.
- B. Grain Direction for Wood Grain Plastic Laminate:
1. Vertical on both doors and drawer fronts, with continuous vertical matching.
  2. Vertical on doors, horizontal on drawer fronts.
  3. Lengthwise on face frame members.
  4. Vertical on end panels.
  5. Side to side on bottoms and tops of units.
  6. Vertical on knee-space panels.
  7. Horizontal on aprons.
- C. Exposed Materials:
1. Plastic Laminate: Grade HPDL

2. Unless otherwise indicated, provide specified PVC edgebanding on all exposed edges, machine applied using waterproof hot melt adhesive. Machine profile exposed edges with 1/8-inch radius:
  - a. Edges of Doors and Drawer Fronts: 3 mm PVC edge banding.
  - b. Edges of Case Body panels: 1mm PVC edge banding.
  - c. Edges of Shelves: 1mm PVC edge banding (four sides).

D. Semi-Exposed Materials:

1. Plastic Laminate: Grade LPDL unless otherwise indicated. Provide plastic laminate for semi-exposed surfaces unless otherwise indicated.
  - a. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.
2. Thermoset Decorative Panels: Provide thermoset decorative panels for semi-exposed surfaces unless otherwise indicated.
  - a. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.
3. Hardboard: Use only for cabinet backs where exterior side of back is not exposed.
4. Unless otherwise indicated, provide specified edgebanding on all semi-exposed edges.

E. Concealed Materials:

1. Solid Wood: Any hardwood or softwood species, with no defects affecting strength or utility.
2. Plywood: Hardwood plywood.
3. Plastic Laminate: Grade BKL.
4. Particleboard.
5. MDF.
6. Hardboard.

2.4 MATERIALS

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: ANSI A208.1, Grade M-2.



- E. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade M-2, except for density.
- F. MDF: ANSI A208.2, Grade 130; made with binder containing no urea formaldehyde.
- G. Hardboard: ANSI A135.4, Class 1 Tempered.
- H. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
  - 1. Manufacturers: Basis of design Wilsonart or comparable product by one of the following:
    - a. Abet Laminati Inc.
    - b. Arborite.
    - c. Formica Corporation.
    - d. Lamin-Art, Inc.
    - e. Nevamar; a Panolam Industries International, Inc. brand.
    - f. Pionite, a Panolam Industries International, Inc. brand.
- I. Edgebanding for Plastic Laminate: Plastic laminate matching adjacent surfaces for cabinet body and Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, 1 mm thick elsewhere.
- J. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- K. Edgebanding for Thermoset Decorative Panels: PVC or polyester edgebanding matching thermoset decorative panels.

## 2.5 COLORS AND FINISHES

- A. Thermoset Decorative Panel Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.
- B. Plastic-Laminate Colors, Patterns, and Finishes:
  - 1. As selected by the Architect from manufacturer's standard colors and patterns.
- C. PVC Edgebanding Color: As selected from casework manufacturer's full range.

## 2.6 FABRICATION

- A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:
  - 1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard. Provide exterior grade plywood for cabinet base in contact with floor.

2. Shelves: 3/4-inch-thick particleboard.
  3. Backs of Cabinets: 1/2-inch thick particleboard or MDF where exposed, Drawer Fronts: 3/4-inch particleboard.
  4. Drawer Sides and Backs: 1/2-inch hardwood plywood, with glued dovetail or multiple-dowel joints.
  5. Drawer Bottoms: 1/4-inch hardwood plywood glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24-inches wide.
  6. Drawer Bodies: Steel drawer pans formed from 0.0359-inch thick metal, metallic phosphate treated, and finished with manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil for topcoat and 2 mils for system.
  7. Doors 48-Inches High or Less 3/4-inch thick, with particleboard or MDF cores and solid-wood stiles and rails.
  8. Doors More Than 48-Inches High: 1-1/16-inches thick, with honeycomb cores and solid hardwood stiles and rails.
  9. Doors More Than 48-Inches High: 1-1/8-inches thick, with particleboard cores.
- B. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.

## 2.7 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Butt Hinges: Stainless-steel, semi--concealed, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48-inches high, and provide three hinges for doors more than 48-inches high.
- C. Pulls: Solid stainless-steel wire pulls, fastened from back with two screws. For sliding doors, provide recessed stainless-steel flush pulls. Provide two pulls for drawers more than 24-inches wide.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide two catches on doors more than 48-inches high.
- E. Drawer Slides: BHMA A156.9, Type B05091.
1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides.
- F. Label Holders: Stainless-steel, sized to receive standard label cards approximately 1/2 by 2-inches, attached with screws or brads.
1. Provide label holders where indicated.

- G. Drawer and Hinged Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
  - 1. Provide a minimum of two keys per lock and six master keys.
  - 2. Provide locks where indicated on all doors and drawers.
- H. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door units.
- I. Adjustable Shelf Supports: Two-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

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

#### 3.2 CASEWORK INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Install casework level, plumb, and true; shim as required, using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16-inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16-inch. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16-inch of a single plane. Fasten to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16-inch.
- E. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards".
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

- G. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

### 3.3 CLEANING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123216

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## SECTION 123553.13 - METAL LABORATORY CASEWORK

## 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. Metal laboratory casework.
  - 2. Filler and closure panels.

- B. Related Requirements:

- 1. Section 042200 – “Concrete Unit Masonry” for wall substrate to anchor cabinets.
  - 2. Section 061053 - "Miscellaneous Rough Carpentry" for wood blocking for anchoring laboratory casework.
  - 3. Section 123616 – “Metal Countertops” for countertops with the metal laboratory casework.

## 1.3 PREINSTALLATION MEETINGS

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

## 1.4 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.
- B. Coordinate installation of laboratory casework with installation of fume hoods and other laboratory equipment.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For laboratory casework. Include plans, elevations, sections, and attachment details.
  - 1. Indicate types and sizes of cabinets.

2. Indicate locations of hardware.
  3. Indicate locations and types of service fittings.
  4. Indicate locations of blocking and reinforcements required for installing laboratory casework.
  5. Include details of utility spaces showing supports for conduits and piping.
  6. Include details of support framing system.
  7. Indicate locations of and clearances from adjacent walls, doors, windows, and other building components.
- C. Samples for Initial Selection: For factory-applied finishes and other materials requiring color selection.
- D. Samples for Verification: For each type of cabinet finish and each type of countertop material, in manufacturer's standard sizes.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish complete touchup kit for each type and color of metal laboratory casework provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.
- B. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Cabinet Mounting Clips and Related Hardware: Quantity equal to 5 percent of amount installed, but no fewer than 20 of each type.
  2. Modular Countertop Units: Two extra units of each length and material installed.

#### 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with SEFA 8 M.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

#### 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, utility roughing-in and wet work are complete and dry, and temporary HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

#### 1.11 WARRANTY

- A. Warranty Period: One (1) year after Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "HLF Steel Casework" as manufactured by Hanson Lab Furniture, Inc." or a comparable product by one of the following:
  - 1. Bedcolab Ltd.
  - 2. BMC Manufacturing.
  - 3. Hamilton Laboratory Solutions.
  - 4. Kewaunee Scientific Corporation.
  - 5. Lab Crafters, Inc.
  - 6. Lab Fabricators.
  - 7. Mott Manufacturing Ltd.
- B. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. System Structural Performance: Laboratory casework and support framing system shall withstand the effects of the following gravity loads and stresses without permanent deformation, excessive deflection, or binding of drawers and doors:
  - 1. Wall Cabinets (Upper Cabinets): 160 lb/ft.
  - 2. Shelves: 40 lb/sq. ft.



## 2.3 CASEWORK, GENERAL

- A. Casework Product Standard: Comply with SEFA 8 M, "Laboratory Grade Metal Casework."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.4 METAL CABINET MATERIALS

- A. Metal: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.
- B. Nominal Metal Thickness:
  - 1. Sides, Ends, Fixed Backs, Bottoms, Tops, Soffits, and Items Not Otherwise Indicated: 0.048-inch.
  - 2. Back Panels, Doors, Drawer Fronts and Bodies, and Shelves: 0.036-inch except 0.048-inch for back panels and doors of flammable liquid storage cabinets and for unreinforced shelves more than 36-inches long.
  - 3. Intermediate Horizontal Rails, Table Aprons and Cross Rails, Center Posts, and Top Gussets: 0.060-inch.
  - 4. Drawer Runners, Sink Supports, and Hinge Reinforcements: 0.075-inch.
  - 5. Leveling and Corner Gussets: 0.105-inch.
- C. Cabinet Types:
  - 1. Base cabinets.
  - 2. Upper cabinets.
  - 3. Full height cabinets.
- D. Sizes: Refer to drawings.

## 2.5 METAL CABINETS

- A. Fabrication: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Except where otherwise specified, integrally frame and weld cabinet bodies to form dirt- and vermin-resistant enclosures. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32-inch.
- B. Flush Doors: Outer and inner pans that nest into box formation, with full-height channel reinforcements at center of door. Fill doors with noncombustible, sound-deadening material.
- C. Hinged Doors: Mortise for hinges and reinforce with angles welded inside inner pans at hinge edge.

- D. Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal.

Provide drawers with rubber bumpers, polymer roller slides, and positive stops to prevent metal-to-metal contact or accidental removal.

- E. Adjustable Shelves: Front, back, and ends formed down, with edges returned horizontally at front and back to form reinforcing channels.
- F. Toe Space: Fully enclosed, 4-inches high by 3-inches deep, with no open gaps or pockets.
- G. Filler and Closure Panels: Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges unless otherwise indicated.

## 2.6 METAL CABINET FINISH

- A. General: Prepare, treat, and finish welded assemblies after assembling. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: After assembly, clean surfaces of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply laboratory casework manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
  - 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8 M. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
  - 2. Colors for Metal Laboratory Casework Finish: As selected by Architect from manufacturer's full range.

## 2.7 HARDWARE

- A. General: Provide laboratory casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless-steel, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two for doors 48 inches high or less and three for doors more than 48-inches high.
- C. Hinged Door and Drawer Pulls: Solid-aluminum, stainless-steel, or chrome-plated-brass, back-mounted pulls. Provide two pulls for drawers more than 24-inches wide.

1. Design: Wire pulls Rectangular loop pulls with rounded corners.
  2. Overall Size: 1 by 4-1/2-inches.
- D. Door Catches: Nylon-roller spring catches. Provide two catches on doors more than 48-inches high.
- E. Drawer Slides: Side mounted, epoxy-coated steel, self-closing; designed to prevent rebound when drawers are closed; complying with BHMA A156.9, Type B05091.
1. Standard Duty (Grade 1): Full-extension type, with polymer rollers.
- F. Locks: Cam or half-mortise type with five-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E0728.
- G. Sliding-Door Hardware Sets: Laboratory casework manufacturer's standard, to suit type and size of sliding-door units.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION OF CABINETS

- A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
1. Variation of Tops of Base Cabinets from Level: 1/16-inch in 10 feet.
  2. Variation of Bottoms of Upper Cabinets from Level: 1/8-inch in 10 feet.
  3. Variation of Faces of Cabinets from a True Plane: 1/8-inch in 10 feet.
  4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32-inch.
  5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16-inch.
- B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.
- C. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions, with fasteners spaced not more than 16-inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.

1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24-inches o.c. and at sides of cabinets with not less than two fasteners per side.
- D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 16-inches o.c.
- E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- F. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- G. Remove excess sealant or adhesive while still wet and finish joint for neat appearance.

### 3.3 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123553.13

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## SECTION 123616 - METAL COUNTERTOPS

## 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 stainless-steel countertops.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.

## 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver metal countertops only after casework has been completed in installation areas.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

## 1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of construction to receive metal countertops by field measurements before fabrication.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- B. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Section 079200 "Joint Sealants".

## 2.2 STAINLESS-STEEL COUNTERTOPS

- A. Countertops: Fabricate from 0.062-inch- thick, stainless-steel sheet. Provide smooth, clean exposed tops and edges in uniform plane, free of defects. Provide front and end overhang of 1-inch over the base cabinets.
  - 1. Joints: Fabricate countertops without field-made joints.
  - 2. Weld shop-made joints.
  - 3. Sound deaden the undersurface with heavy-build mastic coating.
  - 4. Extend the top down to provide a 1-inch thick bullnose edge.
  - 5. Form the backsplash coved to and integral with top surface, with a 1/2-inch thick top edge and 1/2-inch return flange.

## 2.3 STAINLESS-STEEL FINISH

- A. Grind and polish surfaces to produce uniform, directional satin finish matching No. 4 finish, with no evidence of welds and free of cross scratches. Run grain with long dimension of each piece. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces clean.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of metal countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install metal countertops level, plumb, and true; shim as required, using concealed shims.
- B. Field Jointing: Where possible, make field jointing in the same manner as shop jointing; use fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
- C. Secure tops to cabinets with Z- or L-type fasteners or equivalent; use two or more fasteners at each front, end, and back.
- D. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.

- E. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.
- F. Wall-Mounted Shelves: Fasten to masonry, partition framing, blocking, or reinforcements in partitions. Fasten each shelf through upturned back edge at not less than 24-inches o.c.

### 3.3 CLEANING AND PROTECTION

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over the countertop surfaces. Tape to underside of countertop at a minimum of 48-inches o.c. Remove protection at Substantial Completion.

END OF SECTION 123616



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## SECTION 123661 - SOLID SURFACING COUNTERTOPS AND WINDOW SILLS

## 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. Solid surface material countertops, apron fronts, backsplashes and endsplashes.
  - 2. Solid surface material window sills.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For materials.
- B. Shop Drawings: For countertops and wall cladding. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
  - 1. Show locations and details of joints.
  - 2. Show direction of directional pattern, if any.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
  - 1. Countertop material, 6-inches square.
  - 2. Front edge and backsplash conditions, 8-inches wide, of construction and in configuration specified.
  - 3. Window sill material, 6-inches square.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

## 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

## 1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

## 1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

# PART 2 - PRODUCTS

## 2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Manufacturers: Basis of Design: Subject to compliance provide Corian by DuPont or comparable product by one of the following:
    - a. Avonite Surfaces.
    - b. Formica Corporation.
    - c. LG Chemical, Ltd.
    - d. Meganite Inc.
    - e. Samsung Chemical USA, Inc.
    - f. Swan Corporation (The).
    - g. Transolid Div of Trumbull Industries.
    - h. Wilsonart.
  - 2. Type: Provide Standard type unless Special Purpose type is indicated.
  - 3. Colors and Patterns: As selected by the Architect from manufacturer's standard colors and patterns.
- B. Particleboard: ANSI A208.1, Grade M-2 typical; Grade M-2-Exterior Glue at wet locations.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- D. Sealants: Meet the requirements in Section 079200 "Joint Sealants".

## 2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Custom.
- B. Configuration:
  - 1. Front: 3/4-inch bullnose edge.
  - 2. Backsplash: Straight, slightly eased at corner.
  - 3. End Splash: Matching backsplash.
- C. Countertops: 3/4-inch-thick, solid surface material with front edge built up with same material, unless otherwise indicated.
- D. Backsplashes: 3/4-inch thick, solid surface material, unless otherwise indicated.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate with integrally coved backsplash, and applied sidesplash.
  - 2. Install integral sink bowls in countertops in the shop.
- F. Joints multiple pieces, where required, with joint adhesive to create inconspicuous seam.
  - 1. Joint Locations: Not within 18-inches of a sink or cooktop and not where a countertop section less than 36-inches long would result, unless unavoidable.
  - 2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints where indicated. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.
- G. Cutouts and Holes:
  - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
    - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16-inch into fixture opening.
    - b. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16-inch into fixture opening.
    - c. Provide 3/4-inch full bullnose edges projecting 3/8-inch into fixture opening.
  - 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

## 2.3 WINDOW SILL FABRICATION

- A. Configuration: Provide window sills with the following front style:
  1. Front: 1-1/2-inch built-up edge with radius edge as indicated on drawings and details, unless otherwise indicated.
- B. Window Sills: 3/4-inch thick, solid surface material. Depth of sill may vary based on wall thickness.
- C. Fabrication: Fabricate window sills in one piece unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- D. Polish exposed edges.

## 2.4 ACCESSORIES

- A. Grommets for Cable Passage through Countertops: Provide 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage at each workstation.
  1. Product: Subject to compliance with requirements, provide "OG Series" by Doug Mockett & Company, Inc.
- B. Counter Support Brackets: Provide standard metal counter supports of sufficient size and spacing to support the wall hung countertops.

## 2.5 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants".

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8-inch in 8 feet, 1/4-inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
  - 1. Install metal splines in kerfs in countertop edges at joints where indicated. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
  - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

- H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
  - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- I. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants".
- J. Install window sills by adhering to substrates in strict accordance with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing. Mask areas adjacent to joints to prevent adhesive smears

END OF SECTION 123661

## SECTION 125283 – FIXED BEAM SEATING

## 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 the following fixed seating:
  - 1. Fixed beam mounted seating.
- B. Related Requirements:
  - 1. Section 050553 – “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of components, and finishes for each type of fixed seating.
- B. Samples for Initial Selection: For each type of exposed color, finish, texture, and pattern indicated.
  - 1. Include Samples of accessories involving color and finish selection.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
  - 1. Molded Plastic: Manufacturer's standard-size unit, not less than 3-inches square.
  - 2. Baked-on Coating Finishes: Manufacturer's standard-size unit, not less than 3-inches square.
  - 3. Exposed Fasteners: Full-size units of each type.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of fixed public seating.
- B. Sample Warranty: For special warranty.



## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fixed public seating to include in maintenance manuals. Include the following:
1. Methods for maintaining seat materials.
  2. Precautions for cleaning materials and methods that could be detrimental to seating finishes and performance.

## 1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of fixed public seating required, including accessories and mounting components, from one source from a single manufacturer, unless otherwise indicated.

## 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install fixed public seating until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Coordination: Coordinate delivery schedules with Construction Manager. Do not deliver or install fixed public seating until the areas in which they are to be located are ready to receive them.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fixed public seating that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Structural failures including standards, beams, and pedestals.
    - b. Wear and deterioration of seating material beyond normal use.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
  2. Warranty Period: Two (2) years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain each type of fixed public seating required, including accessories and mounting components, from single source from single manufacturer.
- B. Steel: ASTM A 36/A 36M plates, shapes, and bars; ASTM A 513 mechanical tubing; ASTM A 1008/A 1008M cold-rolled sheet; and ASTM A 1011 hot-rolled sheet and strip.
- C. Metal Finish: Finish exposed metal parts with manufacturer's standard minimum 1.5-mil-thick, epoxy baked-on powder coating.
  - 1. Color: As selected by Architect from manufacturer's full range.
- D. Molded Plastic: High-density polyethylene or polypropylene, blow or injection molded, with smooth or textured surface that is mar and dent resistant.
  - 1. Provide with UV inhibitors to retard fading where exposed to sunlight.
  - 2. Color and Texture: As selected by Architect from manufacturer's full range.
- E. Impact Testing: Provide testing documentation that meets or exceeds 2 x BIFMA 5.4 15.4.2 and 1,000 lb. static load.
- F. Fire Testing: Product must meet or exceed CA TB133.

## 2.2 BEAM MOUNTED SEATING

- A. Fixed Beam Seating without Arms (**FBS-1**):
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; "Gibraltar Series Model C222" without Arms" or pre-approved product:
    - a. Others must be pre-approved as described below:

The architect must pre-approve, in writing, by addendum, other pre-approved manufacturers at least 20 days prior to the bid date, through submission of samples, testing and evidence showing that the bidder has been fabricating detention products of this specific type and quality for at least 10 years. Pre-approval shall not authorize a given manufacture to supply their standard products, each supplier shall supply as specified. Verbal pre-approval shall not be given or accepted.
  - 2. Description: In-line fixed beam with ergonomic seating designed for institutional use.
  - 3. Chair Mounting Beam: Two-inch diameter tubular steel frame bent and welded to provide in-line seating. Flat 11-gage steel plate welded to the frame at each seat location to provide strength, support, and a mounting platform on which the seat is attached.

4. Number of seats per beam: Refer to drawings.
5. Free standing units with glides.
6. Color: As selected by Architect from manufacturer's full range.
7. Seat and Back: One-piece seat and back, rotational molded, high impact polyethylene with ultraviolet light stabilizers to reduce fading.
  - a. Seat Width: 20-inches.
  - b. Seat Depth: 24-1/4-inches.
  - c. Seat Height: 18-inches.
8. Color: As selected by Architect from manufacturer's full range.
9. Overall Dimensions: 26-inches per seat wide by 28-inches deep by 35-1/4-inches high.
10. Limited Replacement Warranty: Two (2) years from date of Substantial Completion.
11. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

**B. Fixed Beam Seating with End Arms (FBS-2):**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; "Gibraltar Series Model C223" with End Arms" or pre-approved product:
  - a. Others must be pre-approved as described below:

The architect must pre-approve, in writing, by addendum, other pre-approved manufacturers at least 20 days prior to the bid date, through submission of samples, testing and evidence showing that the bidder has been fabricating detention products of this specific type and quality for at least ten (10) years. Pre-approval shall not authorize a given manufacture to supply their standard products, each supplier shall supply as specified. Verbal pre-approval shall not be given or accepted.
2. Description: In-line fixed beam with ergonomic seating designed for institutional use.
3. Chair Mounting Beam: 2-inch diameter tubular steel frame bent and welded to provide in-line seating. Flat, 11-gage steel plate welded to the frame at each seat location to provide strength, support, and a mounting platform on which the seat is attached.
4. Number of seats per beam: Refer to drawings.
5. Free standing units with glides.
6. Color: As selected by Architect from manufacturer's full range.
7. Seat and Back: One-piece seat and back, rotational molded, high impact polyethylene with ultraviolet light stabilizers to reduce fading.
  - a. Seat Width: 20-inches.
  - b. Seat Depth: 24-1/4-inches.
  - c. Seat Height: 18-inches.
  - d. Arm Height: 27-inches
8. Color: As selected by Architect from manufacturer's full range.
9. Overall Dimensions: 26-inches per seat wide by 28-inches deep by 35-1/4-inches high.
10. Limited Replacement Warranty: Two (2) years from date of Substantial Completion.

11. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

C. Fixed Beam Seating with Individual Arms **(FBS-3)**:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; "Gibraltar Series Model C224" with Individual Arms" or pre-approved product:

- a. Others must be pre-approved as described below:

The architect must pre-approve, in writing, by addendum, other pre-approved manufacturers at least 20 days prior to the bid date, through submission of samples, testing and evidence showing that the bidder has been fabricating detention products of this specific type and quality for at least ten (10) years. Pre-approval shall not authorize a given manufacture to supply their standard products, each supplier shall supply as specified. Verbal pre-approval shall not be given or accepted.

2. Description: In-line fixed beam with ergonomic seating designed for institutional use.
3. Chair Mounting Beam: 2-inch diameter tubular steel frame bent and welded to provide in-line seating. Flat, 11-gauge steel plate welded to the frame at each seat location to provide strength, support, and a mounting platform on which the seat is attached.
4. Number of seats per beam: Refer to drawings.
5. Free standing units with glides.
6. Color: As selected by Architect from manufacturer's full range.
7. Seat and Back: One-piece seat and back, rotational molded, high impact polyethylene with ultraviolet light stabilizers to reduce fading.
  - a. Seat Width: 20-inches.
  - b. Seat Depth: 24-1/4-inches.
  - c. Seat Height: 18-inches.
  - d. Arm Height: 27-inches.
8. Color: As selected by Architect from manufacturer's full range.
9. Overall Dimensions: 26-inches per seat Wide by 28-inches Deep by 35-1/4-inches High.
10. Limited Replacement Warranty: Two (2) years from date of Substantial Completion.
11. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fixed seating in locations indicated.

3.2 ADJUSTING

- A. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.
- B. Replace any seating components damaged during installation.

END OF SECTION 125283

## SECTION 125500 - DETENTION FURNITURE

## 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. Floor-mounted detention tables.
2. Detention seating.
3. Detention Convex Mirrors.
4. Detention Mattresses.
5. Detention Property storage containers.

## B. Related Requirements:

1. Section 050553 – “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
2. Section 087163 - "Detention Door Hardware" for security key cabinets.
3. Section 102813.63 - "Detention Toilet Accessories" for detention toilet and bath accessories.
4. Section 079200 – “Joint Sealants” for security sealants to be utilized at furniture attachment to substrate.
5. Section 111916 - "Detention Gun Lockers" for detention gun lockers.
6. Section 135500 - “Prefabricated Modular Steel Cells” for furnishings included with the cells.

## 1.3 COORDINATION

- A. Coordinate installation of anchorages for detention furniture. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.
- B. Coordinate size and location of recesses in wall construction to receive detention furniture.

## 1.4 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention furniture.
- B. Sustainable Design Submittals:
  1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
  2. Product Data: For sealants, indicating VOC content.
  3. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For detention furniture.
  1. Include plans, elevations, sections, and attachment details.
  2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
  3. Indicate locations and installation details of built-in anchors.
  4. Show elevations of detention furniture and indicate dimensions of furniture, preparations for receiving anchors, and locations of anchorage.
  5. Show details of attachment of detention furniture to built-in anchors.
- D. Samples for Initial Selection: For detention furniture with factory-applied color finishes.
- E. Samples for Verification: For each type of detention furniture indicated.
  1. Furniture: Full-size units. Approved Samples may become part of the completed Work.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of detention furniture from manufacturer.
- C. Other Informational Submittals:
  1. Examination reports documenting inspections of substrates, areas, and conditions.
  2. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
  3. Field quality-control reports documenting inspections of installed products.
  4. Field quality-control certification signed by Contractor and Detention Specialist.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
  2. Tools: Provide two sets of tools for installing and removing security fasteners.

## 1.7 QUALITY ASSURANCE

### A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
2. AWS D1.3, "Structural Welding Code - Sheet Steel".
3. AWS D1.6, "Structural Welding Code - Stainless Steel".

## 1.8 FIELD CONDITIONS

### A. Field Measurements: Verify openings for recessed detention furniture by field measurements before fabrication.

## PART 2 - PRODUCTS

## 2.1 DETENTION TABLES

### A. 4-Person Floor-Mounted Table (Dayroom):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Norix Max-Master series. MX4200-4M
2. Type:
  - a. Four seat, 42" diameter.
  - b. Stainless steel Quitecore top: 18 gage, type 304 wrapped around sound deadening core. 1-1/4" edge profile.
    1. Include Game top (GT) checkerboard as shown on drawings.
  - c. Legs and top support members to be 3" diameter, Black powder coated 14 gage steel tubing.
  - d. Seating mount plate to be 6" x 6" x 1/4" plate.
  - e. One-piece, welded assembly; all welds neatly finished.
  - f. Stool seat shall be, Super Slammer Stone seats: 13" in diameter high density color impregnated compression molded composite.
  - g. Fully welded 2-5/8" diameter by 1/4" steel plate insert in bottom of each seat tube with anchorage and security fasteners as detailed for anchoring to floor.

### B. 4-Person Floor-Mounted Table (**Secure Conference Rooms**):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Leg Style Table, "Model Nos. LS 4242MA".
2. Tabletop:
  - a. Material: High-pressure laminate bonded to a core of 45 lb. density particle board with Molded edge and embedded T-nuts for securing top to base.



- b. Profile: 1-1/2-inches.
  - 3. Bolt-Down Configuration Legs: Steel tubing welded to steel plate for attaching top.
  - 4. Legs: 4".
  - 5. Edge, Top, and Leg colors/finishes to be selected by architect from manufacturers standard options.
  - 6. Capacity: Four persons.
  - 7. Steel Finish: Baked enamel or powder coat.
  - 8. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.
  - 9. Quantity: Provide two (2) per secure area conference room
- C. 2-Person Floor-Mounted Table:**
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Econo-Max Table, "Model No. EMX3033-2GT".
  - 2. Tabletop:
    - a. Size: Minimum 30-inches by 33-inches by 31-1/2-inches high.
    - b. Material: Rectangular 12 gage stainless steel.
    - c. Edge: 1-1/2-inch drop edge.
    - d. Finish: Stainless-steel Type 304.
  - 3. Base:
    - a. 6-inches by 6-inches by 1/4-inch steel plate for mounting top and seats.
    - b. Tamper-resistant bolt down application.
    - c. 2-1/2-inch diameter 14 gage steel tubing.
    - d. Steel Finish: Baked enamel or powder coat.
  - 4. Seats:
    - a. Size: 12-inch diameter.
    - b. Height: 19-1/4-inches.
    - c. Material: 14 gage stainless-steel, No. 4 finish.
  - 5. Capacity: Two person.

## 2.2 DETENTION SEATING

### **A. Floor-Mounted Stool:**

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Ironman, "Model No. S561-120".
- 2. Stool Description: Pedestal type stool with base plate.
  - a. Seat Size: 12-inch diameter by 18-inches high.
  - b. Seat Material: 14-gage stainless steel.

- c. Base: 2-1/2-inch diameter, 14-gage steel tube fully welded top and bottom to two 6-inches by 6-inches by 1/4-inch steel plates.
- d. Base Plate: 6-inches by 6-inches by 1/4-inch plate with four anchor locations.
- e. Base Finish: Powder coat.
- f. Mounting: Directly to floor; hardware not included.
- g. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

B. Floor-Mounted Bench:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Ironman Bench, "Model No. IBF-72".
- 2. Bench Description: Floor mount bench with legs and cuff rings.
  - a. Size: 72-inches Long by 18-inches Deep by 18-inches High OR supply as shown on drawings. Installer must field verify for final dimensions.
  - b. Material: 12-gage steel seating surface 2-inch return.
  - c. Cuff Rings: 3/8-inch diameter.
  - d. Legs: 2-inches by 2-inches by 3/16-inches standard angle with bolt down tabs.

C. Floor-Mounted Bench:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Ironman Bench, "Model No. IBF-96".
- 2. Bench Description: Floor mount bench with legs and cuff rings.
  - a. Size: 96-inches Long by 18-inches Deep by 18-inches High OR as shown on drawings. Installer must field verify for final dimensions.
  - b. Material: 12-gage steel seating surface 2-inch return.
  - c. Cuff Rings: 3/8-inch diameter.
  - d. Legs: 2-inches by 2-inches by 3/16-inches standard angle with bolt down tabs.

## 2.3 DETENTION CONVEX MIRRORS

- A. Basis-of-design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Duravision convex mirror system.
- B. Types:\*\*\* *As shown on drawings or separate schedule – select from types below* \*\*\*
  - a. FD18 Full dome 18"
  - b. FD23 Full dome 24"
  - c. HD18 Half dome 18" x 9"
  - d. HD24 Half dome 24" x 12"
  - e. HD36 Half dome 36" x 18"
  - f. QD12 Quarter dome 12" x 12"
  - g. QD18 Quarter dome 18" x 18"
  - h. WD12 Wall dome 12" diameter.
  - i. WD18 Wall dome 18" diameter.

3. Material:
  - a. Frame 1" x 1/4" steel.
  - b. Mirror 1/8" polycarbonate coating.
4. Fabrication:
  - a. Pure silver reflective coating on inside surface.
  - b. Fully enclosed foam insert fills cavity to reduce flexing and enhance strength.
5. Color:
  - a. Mirror: Silver
  - b. Frame: cream

## 2.4 DETENTION MATTRESSES

### A. Bunk Mattresses:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Comfort Shield Custody.
2. Mattress Description: Sealed seam mattress with integrated double-sided pillow.
  - a. Provide:
    - 1) Norix Custody Blue – (General Population)
    - 2) Norix Custody Black Max - (Medical, Booking / Holding)
  - b. Size: Mattresses sized to fit specific bunk pan sizes.
  - c. Quantity: Provide 1 per sleeping surface.
  - d. Material: 11 ounce densified polyester fiber core encased in a reinforced ripstop; fire retardant, polyurethane coated cover with welded seams.
  - e. Features:
    - 1) Anti-fungal and anti-microbial.
    - 2) Breathable vent for repelling fluids.
    - 3) Puncture resistant.
  - f. Finish: Catalyzed vinyl sealer coat plus catalyzed varnish top coat.
  - g. Color: Silver.
  - h. Warranty: Five (5) years.
  - i. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

## 2.5 PROPERTY STORAGE

### A. Personal Property Storage:

1. Basis-of-Design Product: Subject to compliance with requirements, provide "PB300 Tank Box Property Storage Container" as manufactured by Norix Group, Inc.
2. Description: Molded, 3-dimensional, stackable and alternatively nests with 180 degree turn storage container.
  - a. Provide 1 per sleeping surface mounted under lower bunk and on steel rails.
  - b. Overall Box Size: 25-1/2-inches Wide by 17-1/2-inches Deep by 12-7/8-inches High.
  - c. Material: Injection molded, high-impact polypropylene copolymer.
  - d. Color: As selected by Architect from manufacturer's standard colors.
  - e. Warranty: Ten (10) years
  - f. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

## 2.6 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Coordinate dimensions and attachment methods of detention furniture with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- C. Shear and punch metals cleanly and accurately. Remove burrs.
- D. Form and grind edges and corners to be free of sharp edges or rough areas.
  1. Fabricate detention furniture with no more than 1/32-inch gap between component materials. Weld edges that cannot be crimped to meet tolerance so as to provide a seamless joint with no place for concealment of contraband.
- E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- F. Weld corners and seams continuously to comply with referenced AWS standard and the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention furniture rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.
- H. Cut, reinforce, drill, and tap detention furniture as indicated to receive hardware, security fasteners, and similar items.
- I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.
- J. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security fasteners. Locate joints where least conspicuous.

## 2.7 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling" After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- B. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
  1. Color and Gloss: As selected by Architect from manufacturer's full range.

## 2.8 STAINLESS-STEEL FINISHES

- A. General: Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. Intermediate Polish Finish: No. 4 unless otherwise indicated.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention furniture.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention furniture before detention furniture installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention furniture.
- D. Verify locations of detention furniture with those indicated on Shop Drawings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention furniture to in-place construction. Include threaded fasteners for concrete and masonry inserts, security fasteners, and other connectors.
- B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention furniture. Set detention furniture accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- D. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  - 5. Fillet Welds: Minimum size of 1/8-inch by 1-1/2-inches long, spaced not greater than 12-inches o.c. Fill spaces between welds with security sealant or auto body filler where weld is exposed.
  - 6. Fillet Welds: Continuous.

- E. Assemble detention furniture requiring field assembly with security fasteners with no exposed fasteners on exposed faces and frames.
- F. Anchor furniture to floors and walls at intervals required by expected loads, but not more than 12-inches o.c.
  - 1. Install anchors through backup reinforcing plates where necessary to avoid metal distortion.
  - 2. Use security fasteners with head styles appropriate for installation requirements, strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project. Provide stainless-steel security fasteners in painted materials.
  - 3. Weld nuts onto cast-in-place anchors after installation so as to be nonremovable.
- G. Apply security sealant at all exposed gaps between detention furniture and adjacent construction greater than 1/16-inch.

### 3.3 FIELD QUALITY CONTROL

- A. Detention Equipment Contractor shall inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents. Prepare field quality-control certification endorsed by Detention Specialist that states installed products and their installation comply with requirements in the Contract Documents.

### 3.4 CLEANING AND PROTECTION

- A. Touchup Painting: Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 125500

## SECTION 125600 – INSTITUTIONAL FURNITURE

## 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. Free-standing tables.
- 2. Free-standing seating.
- 3. Video visitation cabinets.

- B. Related Requirements:

- 1. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment and fixtures within the secure perimeter.
- 2. Section 079200 - "Joint Sealants" for security sealants to be utilized at furniture attachment to substrate.
- 3. Section 087163 - "Detention Door Hardware" for security key cabinets.
- 4. Section 125500 - "Detention Furniture" for floor-mount detention furniture.

## 1.3 COORDINATION

- A. Coordinate installation of anchorages for detention furniture. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.
- B. Coordinate size and location of recesses in wall construction to receive detention furniture.

## 1.4 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for detention furniture.

- B. Sustainable Design Submittals:



1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
  2. Product Data: For sealants, indicating VOC content.
  3. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For institutional furniture.
1. Include plans, elevations, sections, and attachment details.
  2. Indicate locations, dimensions, and profiles of wall and floor reinforcements.
  3. Indicate locations and installation details of built-in anchors.
  4. Show elevations of detention furniture and indicate dimensions of furniture, preparations for receiving anchors, and locations of anchorage.
  5. Show details of attachment of detention furniture to built-in anchors.
- D. Samples for Initial Selection: For detention furniture with factory-applied color finishes.
- E. Samples for Verification: For each type of detention furniture indicated.
1. Furniture: Full-size units may be requested by architect. Approved Samples may become part of the completed Work.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of detention furniture from manufacturer.
- C. Other Informational Submittals:
1. Examination reports documenting inspections of substrates, areas, and conditions.
  2. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
  3. Field quality-control reports documenting inspections of installed products.
  4. Field quality-control certification signed by Contractor and Detention Specialist.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Security Fasteners: Furnish not less than one box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.
  2. Tools: Provide two sets of tools for installing and removing security fasteners.

## 1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
  - 2. AWS D1.3, "Structural Welding Code - Sheet Steel".
  - 3. AWS D1.6, "Structural Welding Code - Stainless Steel".
- B. Source Limitations for Detention Furniture: Obtain each type of detention furniture from single source from single manufacturer.

## 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify openings for recessed detention furniture by field measurements before fabrication.

## PART 2 - PRODUCTS

### 2.1 VIDEO VISITATION CABINETS

- A. Lobby & Group:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; IntelStation Open Style Cabinet.
    - a. Lobby: Model No. LBK0S2 & LBK0S6 – floor mount, back to back, units with attached seating.
    - b. Group: Model No. LBW0N1 – wall mount, ADA compliant.
  - 2. Description:
    - a. Sides, Mounting and Writing Surface: High-pressure, graffiti resistant laminate bonded to 45 lb. density particle board with “T” mold vinyl edges. Panels connect with internal barrel bolts.
    - b. Legs: Fully welded 3-inch diameter steel tube, 14-gage finished with black powder coat paint.
    - c. Seats: 13-inch diameter high-density color impregnated composite. Color: As selected by Architect from standard colors.
    - d. Seat Height: 19-3/16-inches.
    - e. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.
- B. Dayroom:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; IntelStation Open Style Cabinet – Stainless-Steel

- a. Model No. SBW7S – wall mount with attached seating.
  - b. Model No. SBW7N – wall mount, ADA compliant.
2. Description: Wall mount open cabinet.
- a. Sides, Mounting and Writing Surface: 12 gage, #4 finish stainless steel.
  - b. Legs: Fully welded 3-inch diameter steel tube, 14-gage finished with black powder coat paint.
  - c. Seat: 13-inch diameter high-density color impregnated composite. Color: As selected by Architect from standard colors.
  - d. Seat Height: 19-3/16-inches.
  - e. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

## 2.2 SECURITY SEATING & TABLES

### A. 24/7 Secure Task Chair:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; "CommandMaster Supervisor "Model No. C182" or equal.
2. Chair Description: Adjustable security chair with arms.
  - a. Overall Size: 28 to 29-1/2-inches wide by 25 to 31-3/4-inches deep by 33 to 40-1/2-inches high.
  - b. Seat Size: 19-1/2-inches wide by 19-1/2-inches deep.
  - c. Material:
    - 1) Base: Heavy-duty cast aluminum with five legs with casters.
    - 2) Seat/Back: 16-gage steel seat plate and inner back are formed steel pans covered with molded high resiliency foam and specified fabric.
    - 3) Fabric: Nocerus Hide Urethane Puncture Resistant.
  - d. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

### B. 24/7 Secure Stool:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; CommandMaster Stool, "Model No. C185" or equal.
2. Stool Description: Adjustable security stool with arms.
  - a. Overall Size: 28 to 29-1/2-inches wide by 25 to 31-3/4-inches deep by 38-1/2 to 48-3/4-inches high.
  - b. Seat Size: 19-1/2-inches wide by 19-1/2-inches deep.
  - c. Material:
    - 1) Base: Heavy-duty cast aluminum with five legs with casters.

- 2) Seat/Back: 16-gage steel seat plate and inner back are formed steel pans covered with molded high resiliency foam and specified fabric.
  - 3) Fabric: Nocerus Hide Urethane Puncture Resistant
- d. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.

**C. Multi-purpose stack chair (Secure Conference Rooms):**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Progress Chair, "Model No. C920".
2. Quantity: 8 per room
3. Chair Description: Ergonomic armless stackable chair.
  - a. Overall Size: 19-3/4-inches wide by 23-1/4-inches deep by 32-inches high.
  - b. Seat Height: 17-1/4-inches.
  - c. Material:
    - 1) Seat Shell: One-piece injection-molded high-impact grade.
    - 2) Legs: 16-gage elliptical shaped welded steel tube.
    - 3) Finish: Powder coated, black.
  - d. Color: As selected by Architect from standard colors.

**D. Multi-purpose security folding tables (Secure Classrooms):**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Correctable, "Model No. T245-320".
2. Quantity: 6 per classroom.
3. Description: High impact polyethylene blow molded top with steel frame and legs. Tamper and contraband resistant construction.
  - a. Testing to static load 500lb.
  - b. Flammability testing: Cal 133, UL1056, ASTM E1537, NFPA 261.

**E. Armless Chair (Secure Classrooms):**

1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Integra Armless Chair, "Model No. C110".
2. Chair Description: One-piece armless, stackable chair.
  - a. Overall Size: 19-inches Wide by 21-1/4-inches Deep by 32-inches High.
  - b. Seat Size: 17-1/2-inches Wide by 17-inches Deep.
  - c. Seat Height: 17-3/4-inches.
  - d. Material: Chemically resistant, high impact grade copolymer polypropylene with FRPP5 Fire Retardant.
  - e. Fabrication: One-piece injection molded with 1-1/2-inch deep "X" rib underside of seat connecting legs diagonally. Honeycomb reinforcing rib cells.

- f. Color: As selected by Architect from standard colors.
- g. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.
- h. Quantity: Provide 24 per secure classroom

**F. Secure Rocking Chair (Medical):**

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Norix Group, Inc.; Rocksmart, "Model No. RA16".
- 2. Quantity: 2.
- 3. Chair Description: One piece rotationally molded, fire retardant, high impact polyethylene, with ultraviolet light stabilizers.
  - a. Overall Size: 25.5-inches wide by 40.125-inches deep by 40.25-inches high.
  - b. Seat Height: 17.5-inches.
  - c. Testing to 500lb static load per BIFMA 5.4 15.4.2
  - d. Color: As selected by Architect from standard colors.
  - e. Product shall meet or exceed UL Greenguard Gold. Supplier to provide testing certification documentation.
  - f. Ten (10) year limited warranty.

**2.3 FABRICATION**

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Coordinate dimensions and attachment methods of detention furniture with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- C. Shear and punch metals cleanly and accurately. Remove burrs.
- D. Form and grind edges and corners to be free of sharp edges or rough areas.
  - 1. Fabricate detention furniture with no more than 1/32-inch gap between component materials. Weld edges that cannot be crimped to meet tolerance so as to provide a seamless joint with no place for concealment of contraband.
- E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- F. Weld corners and seams continuously to comply with referenced AWS standard and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure detention furniture rigidly in place and to support expected loads. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce formed-metal units as needed to attach and support other construction.
- H. Cut, reinforce, drill, and tap detention furniture as indicated to receive hardware, security fasteners, and similar items.
- I. Form exposed work true to line and level with accurate angles, surfaces, and straight sharp edges.
- J. Form exposed connections with hairline joints, flush and smooth using concealed fasteners where possible. Use exposed security fasteners of type indicated or, if not indicated, flat-head (countersunk) security fasteners. Locate joints where least conspicuous.

## 2.4 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling" After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
- B. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

## 2.5 STAINLESS-STEEL FINISHES

- A. General: Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

- B. Intermediate Polish Finish: No. 4 unless otherwise indicated.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention furniture.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention furniture before detention furniture installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention furniture.
- D. Verify locations of detention furniture with those indicated on Shop Drawings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention furniture to in-place construction. Include threaded fasteners for concrete and masonry inserts, security fasteners, and other connectors.
- B. Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention furniture. Set detention furniture accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
- D. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.

4. Finish exposed welds and surfaces smooth and blended at exposed connections so that no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  5. Fillet Welds: Minimum size of 1/8-inch by 1-1/2-inches long, spaced not greater than 12-inches o.c. Fill spaces between welds with security sealant or auto body filler where weld is exposed.
  6. Fillet Welds: Continuous.
- E. Assemble detention furniture requiring field assembly with security fasteners with no exposed fasteners on exposed faces and frames.
- F. Anchor furniture as indicated on Drawings to floors and walls at intervals required by expected loads, but not more than 12-inches o.c.
1. Install anchors through backup reinforcing plates where necessary to avoid metal distortion.
  2. Use security fasteners with head styles appropriate for installation requirements, strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project. Provide stainless-steel security fasteners in painted materials.
  3. Weld nuts onto cast-in-place anchors after installation so as to be nonremovable.
- G. Apply security sealant at all exposed gaps between detention furniture and adjacent construction greater than 1/16-inch.
- H. Install one detention mattress for each detention bunk.

### 3.3 FIELD QUALITY CONTROL

- A. Detention Equipment Contractor (DEC) shall Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Prepare field quality-control certification endorsed by Detention Specialist that states installed products and their installation comply with requirements in the Contract Documents.

### 3.4 CLEANING AND PROTECTION

- A. Touchup Painting: Immediately after erection, clean bolted connections and abraded areas of shop paint, and paint exposed areas with same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 125600



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## SECTION 129300 - SITE FURNISHINGS

## 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. Seating.
- 2. Waste Receptacles.
- 3. Tables.
- 4. Bollard Covers
- 5. Security Bollards
- 6. Smoking Shelter

- B. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for installing pipe sleeves and anchor bolts cast in concrete footings.
- 2. Section 312000 "Earth Moving" for excavation for installing concrete footings.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish, not less than 6-inch- (152-mm-) long linear components and 4-inch- (102-mm-) square sheet components.
- E. Product Schedule: For site furnishings, products selected shall be from a single manufacturer in order to provide as a suite.

## 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals.

## PART 2 - PRODUCTS

## 2.1 SEATING

- A. Subject to compliance with requirements, provide one of the products listed below:
1. Victor Stanley model # CM-53, 6' length, Backless, Recycled Plastic Slats (Color TBD), Surface Mount
  2. Forms+Surfaces model# Tangent Rail Seating, 3 Backed Seats, Slat Seats, Intermediate Armrests, Surface Mount.
  3. Landscape Forms model # Plexus II, Backed, 3 Seat, Wire Grid, No Arms, Surface Mount
  4. Colors to be selected from manufacturers full range including custom and metallic colors.

## 2.2 WASTE RECEPTACLES

- A. Subject to compliance with requirements, provide one of the products listed below:
1. Victor Stanley model # RTH-36, Rain Bonnet Lid w/Ashtray, Recycled Plastic Slats (Color TBD), Surface Mount
  2. Forms+Surfaces model# Urban Renaissance, Rain Bonnet Lid w/Ashtray, 36 Gallon, Dallas Grillwork, Liner w/ drain holes, Surface Mount.
  3. Landscape Forms model # Plexus, Side Opening w/Ashtray insert, 30 Gallon, Surface Mount
  4. Colors to be selected from manufacturers full range including custom and metallic colors.

## 2.3 TABLES

- A. Subject to compliance with requirements, provide one of the products listed below:
1. Victor Stanley model # CM-3, Backless, Recycled Plastic Slats (Color TBD), Surface Mount
  2. Forms+Surfaces model # 6 seat Tangen Ensemble, Backless, Slat Seats, Surface Mount
  3. Landscape Forms model # Plexus, 6 Seat, Backless, Wire Grid Seat, Surface Mount
  4. Colors to be selected from manufacturers full range including custom and metallic colors.

## 2.4 BOLLARD COVERS

1. Basis-of-design: IDEAL SHIELD; 2525 Clark Street, Detroit, Michigan 48209-1355. Phone: (877) 325-0769
  - a. Lengths and height as indicated on drawings.
2. Plastic cover: Polyethylene Thermoplastic (LDPE) tubes having ultra-violet resistance and anti-static properties, nominal thickness 0.250 inches. Color to be selected from Manufacturer's full range including custom colors. Size covers for pipe diameters.

## 2.5 SECURITY BOLLARDS

- A. Subject to compliance with requirements, provide the products listed below:

1. Calpipe Fixed Security Bollard (K4), 8" DIA. SCH 80 ASTM A-53 Carbon Steel, Powder Coated, Standard Flat Top, [www.calpipebollards.com](http://www.calpipebollards.com)
  - a. Color to be selected from manufacturers full range including custom and metallic colors.
  - b. Footings per drawings and manufacturer requirements to achieve K4 rating.
2. Calpipe Fixed Standard Bollard, 8" DIA. SCH 40 ASTM A-53 Carbon Steel, Powder Coated, Standard Flat Top, [www.calpipebollards.com](http://www.calpipebollards.com)
  - a. Color to be selected from manufacturers full range including custom and metallic colors.
  - b. Footings per drawings and manufacturer recommendations.

## 2.6 SMOKING SHELTER

1. Basis-of-design: HANDI-HUT INC. Phone: 800-603-6635
  - a. Model #S6-3PH, 15'x7'-5" Poly-Hip Roof Smoking Shelter, Front Left Opening
2. Finishes/Colors to be selected from manufacturers full range including custom and metallic powder coat colors.

## 2.7 MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:
  1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211.
  2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221.
  3. Structural Pipe and Tube: ASTM B 429.
  4. Sheet and Plate: ASTM B 209.
  5. Castings: ASTM B 26.
- B. Steel: Free of surface blemishes and complying with the following:
  1. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53, Grade B, Type E or S, Schedule 40 unless otherwise noted.
- C. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant.
- D. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M; recommended in writing by manufacturer, for exterior applications.
- E. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof coating; recommended in writing by manufacturer, for exterior applications.

- F. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:
  - 1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil thick.
  - 2. Hot-Dip Galvanizing: According to ASTM A 123, ASTM A 153 or ASTM A 924

## 2.8 FABRICATION

- A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.
- B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- E. Factory Assembly: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

## 2.9 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.10 ALUMINUM FINISHES

- A. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.
- D. Metal Guardrail:
  - 1. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 129300

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## SECTION 135500 – PREFABRICATED MODULAR STEEL CELLS

## PART 1 – GENERAL

Note: The supply and installation of Manufactured Steel Detention Modules shall be the responsibility of the Detention Equipment Contractor (DEC). The steel module manufacturer is providing material (modules) to the DEC at the job site only. The DEC is responsible for supplying, coordination of drawing submittal and equipment with other trades, scheduling, taking delivery, installation, protection of the modules during construction, and warranty of the modules in addition to any manufacturer's warranty.

## 1.1 SCOPE

- A. The Detention Module Manufacturer must submit all data as required in 1.1D, items 1 thru 7. All of the documentation must be complete and accurate with bid. Any deviations from, or omissions of, the required information will disqualify the Detention Module Manufacturer (DMM) from this project.
- B. This specification covers the requirements, including labor, materials, services and equipment for the manufacturing, delivering and installing of pre-engineered, prefabricated Steel Detention Modules. Modules are defined as a factory built completely fabricated five sided galvanized or galvanized steel unitized assembly furnished, finished, equipped and shipped to the project jobsite ready for immediate installation.
- C. The following Detention Module Manufacturer is approved:
  - 1. Steel Cell of North America, Inc., Baldwin, Ga.
- D. Bid submittal requirements for bidders seeking to gain pre-qualification: The owner wants to confirm that the Detention Module Manufacturer has the experience, ability, testing, engineering, quality control and ability to adequately perform prior to award. *Failure to submit all data noted in items below with the Detention Module Manufacturer's (DMM) bid shall cause Detention Equipment Sub-Contractor's (DEC) total inclusive bid to be deemed non-responsive and thus disqualified.*
  - 1. Detention Module Manufacturer (DMM) Experience: Modular modules are life/safety devices that protect the inmates, jail staff, and the general public. The detention module manufacturer shall submit a total list of projects, in its entirety, attesting to their experience to perform and a body of work that proves ability.
    - a. The list shall be from the manufacturer's own experience and shall not be the experience of other entities.
    - b. Each project listed shall include the following information:
      - 1) The name and location of project.
      - 2) The name of the architectural firm.
      - 3) The name and number of the DMM's direct customer for project.



2. Detention Performance Testing: Performance testing provides confidence that the DMM's products adequately perform to established minimum industry standards. Submit current reports as proof of performance testing:
  - a. ASTM F2322-12; Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities,
  - b. ASTM F2697-15; Physical Assault on Horizontal Fixed Barriers for Detention and Correctional Facilities
  - c. ASTM F1450-12; Hollow Metal Swinging Door Assemblies for Detention Facilities.
  - d. Provide testing in compliance with ASTM F-33 committee's draft test (ASTM WK57116) for impact and static load testing of detention module furniture.
    - 1) Wall mounted module bunk.
    - 2) Wall mounted module desk.
    - 3) Wall mounted module seat.
  - e. Provide STC (*Sound Transmission Coefficient*) test report in compliance with specified rating of 53 between adjoining modules.
    - 1) Testing shall be certified by a reputable acoustical engineering company.
    - 2) Testing shall be on acoustical materials in compliance with the specification herein.
3. Corrosion Protection: Corrosion is a short and long term concern. Submit a letter on DMM's company letterhead to the Detention Equipment Contractor that all steel materials used will only be corrosion resistant galvanized, galvanized, or stainless steel.
4. Coating Testing: The coatings specification herein requires a ten (10) year warranty. Submit coating system performance testing as proof that the polyurea coating system will adequately perform as specified.
  - a. Adhesion to prepared galvanized steel: ASTM D-4541, 850 PSI.
  - b. Tensile Strength: ASTM D-638, 3000 PSI.
  - c. Elongation: ASTM D-638, 425%.
  - d. Hardness: ASTM D-2240, Shore D-51.
  - e. Tear Strength: ASTM D-624, 495 PLI.
  - f. Abrasion Resistance: ASTM D-4060, 1000 g 1000 cycles CS-17: 6 mg loss.
  - g. Accelerated Weathering: ASTM G-53, 3,000 Hrs.
  - h. Gardner Impact: ASTM 2794, 160 in. lbs.
  - i. Salt Fog Resistance: ASTM B117-90, 3,000 Hrs.
  - j. To confirm coating experience and material durability the DMM must submit a list of at least twenty-five (25) other similar projects that are in operation in the last ten (10) years using this coating system.
    - 1) Provide the name of the project and location of the project, and the date of completion of each project, based on the owner taking occupancy of each

- project.
- 2) This information shall be from the detention module manufacturer and not from any other entity.
  5. Seismic Performance: Modules are structural elements within the building shell. Modules shall safely withstand an acceleration,  $S_s$ , equal to 300% of gravity. Submit engineering calculations to confirm that modules meet this requirement.
  6. Quality Control: Only the highest quality products available that meet all applicable building codes are desired.
    - a. Provide proof that the DMM is registered with the Indiana Board of Building Standards (BBS) as a modular manufacturer.
    - b. DMM Shall provide a letter from a BBS approved third party inspection company that it has been retained to inspect the modules per BBS building code and quality stipulations.
  7. Project Schedule: The project construction schedule is important and should proceed without unwarranted delays. The DMM shall submit the following information:
    - a. State in writing the number of weeks needed to submit a complete submittal package for approval and anticipated fabrication schedule.
    - b. State in writing the amount of time required to install product once received on job site.

## 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section includes labor, materials, services and equipment for the manufacturing, delivering and installation of engineered, prefabricated modular steel detention cells.
- C. Related Sections:
  1. Section 033000 - "Cast-in-Place Concrete" for slab quality.
  2. Section 034100 - "Precast Structural Concrete" for interior walls within the housing units.
  3. Section 034500 - "Precast Prestressed Hollow Core Slab Units" for mezzanine floor system within the housing units.
  4. Section 050553 - "Security Metal Fastenings" for anchoring or attaching building elements, furniture, equipment, accessories and fixtures within the secure perimeter.
  5. Section 079200 - "Joint Sealants" for security sealants.
  6. Section 087163 - "Detention Door Hardware" for specialty hardware
  7. coordination.
  8. Section 088853 - "Security Glazing" for glazing located within the secured enclosure.
  9. Section 099123 - "Interior Painting" for finish painting cell fronts.

10. Division 21 - Sections for fire suppression system.
11. Section 224600 - "Security Plumbing Fixtures".
12. Division 23 - Sections for HVAC systems.
13. Division 26 - Sections for electrical systems.
14. Division 28 - Sections for electronic safety and security systems.

### 1.3 REFERENCES

- A. The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced herein by basis designation only.
1. ASTM A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  2. ASTM D-638
  3. ASTM D-638
  4. ASTM D-2240
  5. ASTM D-624
  6. ASTM D-4060
  7. ASTM G-53
  8. ASTM 2794
  9. ASTM B117 - Standard practice for Operating Salt Spray (Fog) Testing Apparatus
  10. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
  11. ASTM F33 Committee - Draft test method for steel Bunks, Seats, Tables used in detention facilities.
  12. ASTM F2322-12 - Test Methods for Physical Assaults on Fixed Barriers for Detention Facilities.
  13. ASTM F2697-15 - Physical Assault on Horizontal Fixed Barriers for Detention and Correctional Facilities.
  14. ASTM F1450-12- Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
  15. ANSI/AWS D1.1 – Structural Welding Code Steel
  16. ANSI/AWS D1.3 – Structural Welding Code – Sheet Steel
  17. ANSI/NAAMM HMMA 863 – Guide Specifications for Detention Security Hollow Metal Doors and frames

### 1.4 DEFINITIONS

- A. ANSI American National Standards Institute, Inc.  
11 West 42nd Street  
13th Floor  
New York, NY 10036  
Telephone: 212/642-4900  
[www.ansi.org](http://www.ansi.org)
- B. ASTM American Society for Testing and Materials  
100 Barr Harbor Drive

West Conshohocken, PA 19428-2959  
Telephone: 610/832-9585  
[www.astm.org](http://www.astm.org)

- C. NAAMM National Association of Architectural Metal Manufacturers  
800 Roosevelt Rd.  
Bldg. C, Suite 312  
Glen Ellyn, IL 60137  
Telephone: 630/942-6591  
[www.naamm.org](http://www.naamm.org)

## 1.5 SUMMARY

- A. The Steel Detention Module Manufacturer (DMM) shall provide the following; and as indicated in PART 5 - DIVISION OF RESPONSIBILITY.

Factory Built Five-sided Cell Modules:

1. Security Doors and Frames
2. Security Glazing
3. Embedded Electrical Lighting and Security Electronics
4. Embedded Fire Protection
5. Plumbing Fixtures, and Accessories
6. Integral HVAC Grilles
7. Factory installed Furnishings and Accessories
8. High performance interior coatings and exterior primers

## 1.6 SUBMITTALS

- A. General: Submit the following according to conditions of Contract and Division 1 Specifications Sections.
1. Product data and instructions for manufactured materials and products. Include Manufacturers' certifications and independent laboratory test reports as required.
  2. Submittal drawings prepared showing complete design information for fabrication and installation of Steel Detention Module units. Indicate module dimensions, cross-section, elevations, material specifications, and installation details. Coordinate shop drawings with other trades to ensure compatibility of required service connections.
  3. The maximum dead loads of the modular steel modules, including all equipment, shall not exceed the maximum allowance for the slab or building assembly on which the modules are anchored.
  4. Submit drawings of recommended bearing pads and/or special anchoring devices.
  5. Provide shipping, lifting and handling diagrams indicating point loads and net and gross loads.
  6. Provide catalog data with full performance criteria and dimension for specified components purchased from outside sources.
  7. Provide structural calculations and structural analysis as needed along with as-built

- drawings after receipt of approved as noted drawings.
8. Submittal Information.
- a. Name and location of Project
  - b. Order number
  - c. Name of Manufacturer
  - d. Name of Architect
  - e. Name of Contractor
  - f. Cell dimensions including width, length and height
  - g. Cell equipment, furnishings, and equipment
  - h. Cell coatings and primers
  - i. Governing building code and year of edition
  - j. Building-Use Category: Indicate category of building use
  - k. Installation details and interface with other building components

## 1.7 CLOSEOUT DOCUMENTS

- A. Maintenance Data: For prefabricated modular steel cells to include in maintenance manuals.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURER

- A. Basis-of- Design Product: Subject to compliance with requirements, provide “Modular Steel Cells” as manufactured by SteelCell of North America, Baldwin, GA

### 2.2 ENGINEERING AND DESIGN

- A. The DMM shall provide Professional certification to the architect for the design of the Steel Detention Modules to support superimposed dead loads, live loads and wind loads as indicated on the contract drawings and the specifications herein. The DMM shall certify the design for compliance with applicable governing code and local seismic requirements.
- B. The design shall include integration of Steel Detention Modules into the physical floor plan, sections, elevations, and structural design of the facility and shall assure that all systems specified in the contract documents are interfaced completely with Steel Detention Modules for a fully installed, fully working facility.

### 2.3 WORKMANSHIP

- A. All units shall be tightly fitted and securely fastened with no through seams or cracks.
- B. All panels and assemblies shall be inspected for correct dimensions, joint configuration,

straightness, plumb and square.

- C. All exposed edges shall be chamfered or bent for finger contact.
- D. Out-to-out length, width and height dimensions of individual module units shall be a tolerance of +/- 1/4-inch. (6.4mm). The cumulative tolerance in any direction shall not exceed the available horizontal or vertical dimension for the entire assembly of module units. Module suppliers shall inform the Architect prior to construction, of any dimensional conflicts which may adversely affect the installation of modules.
- E. All panel joints, ceiling joints, and module corner joints exceeding 1/16-inch. (1.6mm) wide and 1/8- inch. (3.2mm) deep shall be filled with high strength epoxy caulk appropriate to application in Detention Environments.
- F. Joints to be welded shall be cleaned and prepared as necessary to assure quality welds.
- G. Welding shall be controlled and sequenced to reduce warpage and distortion.
- H. All welds shall be free of deleterious porosity, pinholes, and cracks.
- I. Finished welds shall be smooth with weld spatter and flux removed.
- J. Provide a permanent label with a cell identification number on the back side of each cell.

#### 2.4 MODULE WALL CONSTRUCTION & STRUCTURAL COMPONENTS

- A. Framing, floors, walls, and ceilings, as required, shall be constructed of galvanized steel, galvanized steel shapes and tubing, conforming to design requirements noted herein to provide adequate structural strength including the ability to support loading as specified.
- B. All walls and ceiling face panels shall be 0.100-inch (12 gage) minimum thickness A-60 galvanized steel conforming to ASTM A 653-CS requirements. All structural or stiffening members shall be 0.058-inch (16 gage) minimum thickness A-60 galvanized steel conforming to ASTM A 653-LFQ requirements. All structural tubing shall be 0.115-inch (11 gage) minimum thickness steel conforming to ASTM A 653-CS and ASTM A-525, G-90 galvanized requirements.
- C. All welders shall be certified to, and all welding shall be in conformance with, the ANSI/AWS D1.1, Structural Welding Code - Steel and/or ANSI/AWS D1.3, Structural Welding Code - Sheet Steel, as applicable.
- D. Tamper resistant fasteners shall be used for all exposed fasteners where required for accessories.
- E. Mounting and bearing pads, anchorage's, shims, or spacers, shall be manufactured of stainless steel.

- F. Smoke Rated Steel Units: Where units are shown or scheduled as requiring smoke rated classification, provide units of design or assemblies tested in accordance with applicable building code approved assemblies or construction materials.

## 2.5 MODULE MEZZANINE LEVEL FLOOR & SECURITY CEILINGS.

- A. Framing for lower and mezzanine level module ceiling as required, shall be constructed of galvanized steel, steel shapes and tubing, conforming to design requirements noted herein to provide adequate structural strength including the ability to support dead and live loading as specified including the support of the mezzanine level walkway.
- B. All floor face panels shall be 0.140 in. (10 gage) minimum thickness A-60 galvanized steel conforming to ASTM A 653-CS requirements. All structural or stiffening members shall be 0.058 in. (16 gage) minimum thickness A-60 galvanized steel conforming to ASTM A 653-LFQ requirements.
- C. All ceiling face panels shall be 0.100 in. (12 gage) minimum thickness A-60 galvanized steel conforming to ASTM A 653-CS requirements. All structural or stiffening members shall be 0.058 in. (16 gage) minimum thickness A-60 galvanized steel conforming to ASTM A 653-LFQ requirements.
- D. Embedded electrical boxes and conduit for module electrical devices and electronics shall be concealed within the ceiling/floor structure routed from the device to the mechanical chase.
- E. All cavities or voids shall be acoustically insulated with the relevant materials noted herein.

## 2.6 DOORS & DOOR FRAMES AT THOSE MODULES WITH SWING DOORS.

- A. All door, door frame, and window construction shall be in accordance with ANSI/NAAMM HMMA 863-04.
- B. All module doors: Face sheets shall be 0.093 in. (12 gage) minimum thickness conforming to ASTM A653/A653M (A60, / Z180) steel.
- C. All doors must satisfy the same performance requirements in accordance with ASTM F1450-12, Grade #1.
- D. Glass and Glazing: Refer to the door schedule and the glazing section of these specifications.
- E. Doors shall be pre-installed by the DMM, with all final adjustments completed by the module installer.

## 2.7 ELECTRICAL

- A. The DMM shall provide the light fixture for each type of Steel Detention Module.

**B. Light Fixture:**

1. The light fixture shall be equal to a Kenal SDSA-4-1/1-45L50K-120-1/9-1-DLN with LED lamps and one (1) LED night light with light level control and shall be corner mounted type. The housing shall be 14 gage steel.
2. The frame shall be 14 gage with 0.250 polycarbonate and 0.125 prismatic acrylic overlay. The finish shall be baked-on white enamel. All fixtures will provide a minimum of 20-foot candles of light at the desk and the mirror per ACA standards.

C. The DMM shall submit photometric's to confirm placement of light fixtures and the correct lumens at the specified locations as per ACA standards.

D. The DMM shall caulk any cracks and or joints between the light fixture and the ceiling with a tamper resistant caulk to prevent contraband concealment.

E. The DMM shall provide a wiring pig tail or whip from the module light to a junction box at the module mechanical chase.

F. The DMM shall provide conduit terminated at a junction box on the mechanical chase wall for all module electrical equipment.

G. The DMM shall provide pull tape in all conduits that are not pre-wired.

H. The Division 26 contractor shall make all permanent connections from the termination point at the module mechanical chase.

I. All security hardware, security electronics and associated wiring, shall be supplied and installed by others. This includes but is not limited to:

1. Module Door and Pass Locks or Slider Devices
2. Module Door Position Switches
3. Module Intercoms
4. Module Surveillance Cameras

**2.8 PLUMBING**

A. The DMM shall provide and install the plumbing fixtures and valve mounting plates for the Module Modules and Shower Unit and Lavatory/Toilet Combination Unit Modules.

The DMM shall caulk any cracks and or joints between the fixtures and the walls with a tamper resistant caulk to prevent contraband concealment.

B. Lavatory/Toilet Combination Unit: See plumbing schedule and Division 22 specifications.

C. Handicap Lavatory/Toilet Combination Unit: See plumbing schedule and Division 22 specifications.

1. 42" Horizontal wall mounted grab bar with anti-suicide plate and weeps.



2. 18" Vertical wall mounted grab bar with anti-suicide plate.
  3. Toilet paper holder shall be recessed wall mounted.
- D. Shower Unit: See plumbing schedule and Division 22 specifications for shower head and controls information. Unit shall consist of a ceiling-mounted all stainless-steel showerhead, electronic single temperature valve and stainless-steel pushbuttons and escutcheon, and 30" x 30" raised stainless steel shower-base with integral p-trap.
- E. Handicap Shower Unit: See plumbing schedule and Division 22 specifications for shower head and controls information. Unit shall consist of a ceiling-mounted all stainless-steel showerhead, electronic single temperature valve and stainless-steel pushbuttons and escutcheon and a wall mounted accessible showerhead. To facilitate access, a sloped floor and drain shall be supplied by others.
1. Wall mounted 32" x 18" L-shape grab bar with anti-suicide plate and weeps.
  2. Wall mounted 18" vertical grab bar with anti-suicide plate.
  3. Wall mounted collapsible handicap seat equal to Willoughby FCC HC
- F. Janitor Closet Mop Sink: Flush to wall floor mounted stainless-steel basin back splash and integral p-trap. See plumbing schedule and Division 22 specifications.
3. Filler and prep by Division 22 contractor.
- G. The flush valves, water control manifolds, p-traps and other plumbing accessories for the plumbing fixtures shall be provided by the DMM separately and installed by the Division 22 Contractor.
1. The Division 22 Contractor is responsible for installing devices per the manufacturer's installation instructions.
  2. The Division 22 Contractor is responsible for startup and any all required adjustments.
  3. The DMM shall provide a voucher from the fixture supplier to the plumber for all plumbing controls and devices.
  4. The plumber shall send the voucher to the plumbing supplier, which will send all specified devices to the project site to the plumber to receive.
- H. DCM shall provide the shower curtains for the shower stalls in the Cell Modules.
1. The shower curtain shall be equal to the Secure Shower Curtain System as manufactured by Imperial Fasteners or Derby Industries.
  2. The shower curtain shall be suicide resistant with attachment via Velcro tabs.
  3. The shower curtain shall be flame and mildew resistant, anti-bacterial.

## 2.9 HVAC

- A. Each Steel Detention Module shall be designed, manufactured and equipped to receive the required HVAC fixtures specified in other divisions of this specification.

- B. The DMM shall provide the HVAC grilles. The supply and exhaust security grilles shall be integral pre-punched into the wall panel in compliance with the specified Mechanical CFM requirements. A flange suitable for the attachment of the HVAC duct shall also be provided.
- C. Security grills shall with 3/16" diameter holes on 9/32" staggered centers. Exhaust CFM shall be a minimum of 300 with a static pressure of 0.03. Supply shall be a minimum of 280 with a static pressure of 0.24.
- D. HVAC Security Grille Testing: The CFM for the DMM's security HVAC grilles shall meet the following minimums
  - 1. Exhaust CFM shall be a minimum of 300 with a static pressure of 0.03.
  - 2. Supply shall be a minimum of 280 with a static pressure of 0.24.
  - 3. The DMM shall submit testing report by an AABC or NEBB certified testing engineer confirming that DMM security grilles meet these minimum requirements.

## 2.10 THERMAL AND ACOUSTICAL INSULATION

- A. Insulation Material: Materials shall be approved by applicable IBC codes and governing authorities and in compliance with the manufacture's application procedures and recommendations including the application of compatible thermal barriers.
  - 1. All exposed insulation shall be a closed cell polyurethane foam equal to NCFI 11-24.
- B. Foam shall meet ASTM E-84  $FS \leq 25$ ,  $SD \leq 450$  at 2-inches thickness.
- C. All cavity type insulation shall be open cell polyurethane foam equal to NCFI 23-010.
- D. Foam shall meet ASTM E-84  $FS \leq 25$ ,  $SD \leq 450$  at 2-inches thickness.
- E. Thermal Insulation: Walls, floors, and ceilings shall be insulated to R-values as follows:
  - 1. Interior Walls: R14 minimum.
  - 2. Exterior Walls: R14 minimum.
  - 3. Floor and Ceiling: R8.
- F. Acoustical Insulation: The walls and floors between modules and adjacent modules shall have a Sound Transmission Classification (STC) of 53. Module Fronts shall have a STC of 35. Back of modules to rear mechanical chase and front chase walls to mechanical chase shall have a STC of 40.

## 2.11 FURNISHINGS, AND ACCESSORIES

- A. Steel Detention Module Furniture: Where shown on the contract drawings as module furniture to be so provided, the DMM shall provide and install wall mounted bunks,

tables and stools. Bunks, tables, and stools shall be fabricated of ASTM 653 steel ASTM 525 grade A60 galvanized, 0.106-inch (2.7mm) minimum thickness and of the sizes shown. DMM shall include drawings which detail materials, construction, and attachment.

These drawings shall be a part of the submittals as outlined in Section 1.6 herein. Fabrication of these items shall not begin prior to the Architect's approval.

- B. Fixtures, Furnishings and Accessories Load Test: Reinforce walls, stiffen furnishings, and provide connections as required to support dead loads plus single point (concentrated) static live loads as indicated, at maximum distance on each from wall and from supports for each of the following in accordance with the ASTM draft standard test method for wall mounted steel bunks, seats, and tables used in detention and correctional facilities.
  - 1. Top impact test
  - 2. Static force test
  - 3. Cantilever load test
  - 4. Uplift load test
  - 5. Wall mounted lavatory - 1000 lbf (4.45 kN)
- C. All furniture and equipment shall be designed and installed so as to be flush to the modular walls that leaves no seams or voids for the concealment of contraband. Thus, there shall be no cracks, seams or voids that can be exploited by the inmates to conceal contraband. This includes all seams at cell security equipment including but limited to the following:
  - 1. One-piece stainless steel mirror
  - 2. Anti-ligature clothes hook strips
  - 3. Detention light fixture
  - 4. Penal plumbing fixtures
- D. All seams at equipment noted above that do not comply with ACA standards shall be filled with a pick resistance caulk.

## 2.12 AUTOMATIC FIRE PROTECTION SYSTEMS

- A. The DMM shall provide a prepared location for the installation of the sprinkler head by the fire protection contractor.
  - 1. The sprinkler head shall be provided, installed and tested by fire protection contractor.
  - 2. When ceiling mounted sprinkler heads are required, the DMM to provide a straight section of pipe with no intermediate fittings and a welded 90-degree elbow for connection to the sprinkler head provided and installed by the fire protection contractor. Requirements applicable to all prefabricated cells.
  - 3. Piping and associated welded elbow to be provided for all prefabricated units. If pipe is located outside of the cell, the pressure tested section shall be strapped to the cell for shipping.

4. Piping and sprinkler head opening to be provided by the DMM required for front mounted sprinkler heads required to protect beneath the metal grate walkway.
5. Connection of the cell fire protection piping and front mounted sprinkler heads to the fire protection system shall be made at the mechanical chase by the fire protection contractor.

a. The DMM shall provide a threaded pipe connection for attachment.

- B. The DMM and fire protection contractor shall coordinate to confirm the type and location of the sprinkler head to ensure the proper interface of work.
- C. Refer to specification 211313 "Wet Pipe Sprinkler Systems" for piping materials.

## 2.13 FINISH

- A. Prior to application of coatings, all surfaces shall be cleaned and prepared in accordance with SSPC-SP1, SP6, or SP7 as required or as specified by the coating manufacturer.
- B. All interior steel surfaces of the Steel Detention Module shall be prime coated with a Polyurea Elastomer 26 to 36 mils dft. The coating shall be certified to ASTM E84, Class II for surface burning characteristics and shall meet or exceed the following:

1. Adhesion:	ASTM D-4541	850 PSI.
2. Tensile Strength:	ASTM D-638	3000 PSI.
3. Elongation:	ASTM D-638	425%.
4. Hardness:	ASTM D-2240	Shore D-51.
5. Tear Strength:	ASTM D-624	495 PLI
6. Abrasion Resistance:	ASTM 4060, 1000g, 1000 cycles	CS-17: 6 mg
7. Accelerated Weathering:	ASTM G-53	3,000 Hrs.
8. Gardner Impact:	ASTM 2794	160 in. lbs.
9. Salt Fog Resistance:	ASTM B117-90	3,000 Hrs.

- C. All module interior steel surfaces shall be finish coated for UV protection with a Polyester Urethane Enamel, 3 to 4 mils dft, and shall meet or exceed the following:

1. Abrasion Resistance:	ASTM D4060	90 mg loss
2. Adhesion:	ASTM D4541	825 psi
3. Corrosion Weathering;	ASTM D5894	15 cycles
a. ASTM D714	10 rating	
b. ASTM D610	10 rating	
4. Flexibility:	ASTM D522	Passes
5. Salt Fog Resistance:	ASTM B117	3,000 hours

- D. The exterior of the module fronts and module door along with the cover plates shall be prime painted only with a Catalyzed Epoxy 3 to 4 mils dft, and shall meet or exceed the following:

1. Adhesion:	ASTM D4541	500 psi
2. Corrosion Weathering:	ASTM D5894	3360 hours
3. Direct Impact Resistance:	ASTM D2794	>140 in. lbs.
4. Moisture Condensation:	ASTM D4585	100 F, 1250 hours
5. Salt Fog Resistance	ASTM B117,	1250hrs, Passes

- E. The finish paint of the module front and both sides of module door shall be by the others.
- F. Steel Detention Modules shall be of a single standard color as selected by the Owner from samples submitted by the manufacturer. Available color shall be included with module product data Submittals.

2. 14 MEZZANINE WALKWAY, RAILINGS AND STAIRS.

- A. Mezzanine level walkways, hand-railings, and stairs shall be constructed and installed by others. Mezzanine walkways shall be galvanized.
- B. DMM and fabricator/installer shall coordinate thru the DEC in order to ensure proper interface of work.

PART 3 - DELIVERY AND INSTALLATION

3.1 DELIVERY SEQUENCING AND SCHEDULING

- A. The DEC and DMM shall coordinate the scheduling and sequencing of the module delivery to the project site. A mutually approved schedule shall be determined by the DEC and DMM at the pre-construction meeting. The sequencing of the module units shall conform to this schedule to properly interface the delivery and installation of modules at the proper time during the construction period.
- B. DMM shall deliver Steel Detention Modules to the designated project site, properly protected from shipping damage. The DEC shall provide suitable protective coverings, devices or such methods and procedures to protect the modules from damage from the weather, other trades and vandalism. Protective measures shall remain throughout the construction period. Unloading and handling of the module units shall be the responsibility of the module installer. Final module door adjustments shall be completed by the module installer.

3.2 SITE INSPECTION

- A. The installer of the Steel Detention Modules shall examine areas and conditions under which the units are to be installed. The installer is to notify the construction manager in writing of conditions detrimental to proper completion of the work. Do not proceed with

the work until unsatisfactory conditions have been corrected in a manner acceptable to the module installer

### 3.3 INSTALLATION

- A. The DEC shall provide the DMM a proposed schedule of module delivery and installation sequence before the project bid date in order for the DMM to properly bid the installation of the modules.
- B. The DEC shall be a pre-qualified factory trained and certified module installer to install the Steel Detention Modules. The DMM shall provide as needed a qualified on-site representative for initial module installation to verify proper module offloading and installation procedures.
- C. The DEC shall provide adequate access for the DMM's tractor-trailer transport trucks and the module installer's installation equipment. This access shall be suitable for the DMM's trucks, and the module installer's equipment to maneuver under their own power.
- D. The DEC shall provide adequate space and maneuvering room to install the modules. There shall be no barriers or work of others that restrict or prevent the adequate movement of the modules or the installer's installation equipment.
- E. Steel Detention Modules shall be set in place by the module installer and shall be checked for correct alignment and level.

Shims shall be installed as necessary and securely fastened to the foundation. Complete all connections, trim and touch up, meeting the acceptable industry standards and the DMM's installation instructions.

- F. The DEC shall install trim plates as provided by the DMM per the installation instructions to cover the joint between the modules. All other joints are to be trimmed or caulked by others.
- G. Fill all voids between the bottom of the modules' walls and the floor with security caulk. This shall be completed by others.

## PART 4 – WARRANTY

### 4.1 BY THE DMM

- A. The DMM shall provide a signed warranty agreeing to repair defective materials and workmanship of the Steel Detention Module. The module warranty shall be conditional upon normal use of the modules. Abuse, such as riots are not considered normal use. The Warranty shall be for a period of ten (10) years after substantial completion.

## PART 5 - DIVISION OF RESPONSIBILITY

## 5.1 BY THE DMM

- A. Engineer, design, fabricate, transport deliver for erection by the DEC prefabricated steel detention modules as required for a complete installation. Provide module specific products, system components of other related sections for a complete functionally operational module.
- B. Provide for any structural components needed for support of work including, but not limited to, support for the mezzanine walkway.
- C. For those units with slider doors provide cased opening prepped to receive sliding door device, locking and receiver columns.
- D. For those units with swinging doors provide security hollow-metal framed opening and security door prepped for the specified security hardware and electronic devices.
- E. Provide high build high performance seamless coating system for all interior surfaces and coated components.
- F. Provide wall mounted detention furnishings as specified, welded in place and coated for a seamless finish.
  - 1. Furnishings shall be statically and dynamically tested to ASTM standards as specified.
  - 2. Bunks to include rails on bottom bunk to fit Norix "PB300 – Tank Box" property boxes. One set of rails per sleeping surface. Coordinate with DEC.
  - 3. Towel Hook – use Norix model #ITH-110 and/or #S565-529. Two towel hooks per sleeping surface.
- G. Provide suicide resistant equipment and accessories as specified, secured with tamper resistant fasteners and security caulked as necessary to prevent the concealment of contraband.
- H. Provide stainless steel plumbing fixtures and grab-bars as specified, secured with tamper resistant fasteners and security caulked as necessary to prevent the concealment of contraband.
  - 1. Provide control valves and accessories as specified for field installation by others.
- I. Provide electrical conduit, boxes, and fittings for the light fixtures as specified.
  - 1. The light fixture shall be secured in place and security caulked.
  - 2. Provide a wiring whip from the light to the pull box at the mechanical chase.
- J. Provide electrical conduit, boxes and fittings for security electronics and locks.

1. Provide pull tape from the prep to the pull box at the mechanical chase.
- K. Security caulk at the crack between the bottom of the module and slab on grade shall be supplied and installed by others.
  - L. Provide a prep for the sprinkler head that will be supplied and installed by others.
  - M. All modules shall be inspected by approved third party inspection company for code and quality compliance.
  - N. Provide module to module and module to adjacent wall cover-plates to cover open cracks or joints.
  - O. Mezzanine walkways (galvanized), handrails, and stairs assemblies by others.



DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
<b>1.0</b>	<b>Manufacture module units</b>	X	X		
<b>2.0</b>	<b>Module Security Doors</b>				
2.1	Door Frames	X	X		
2.2	Doors	X	X		
2.3	Hinges	X	X		
2.4	Locks			X	X
2.5	Slider Devices			NA	NA
2.6	Door Closer			X	X
2.7	Pulls			X	X
2.8	Door Window Frame	X	X		
2.9	Door Window Glazing	X	X		
2.10	Food Pass	X	X		
2.11	Food Pass Lock			X	X
2.12	Food Pass Hinge	X	X		
<b>3.0</b>	<b>Module Chase Front</b>				
3.1	Chase Door	X	X		
3.2	Hinges	X	X		

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
3.30	Chase Front and Frame	X	X		
3.4	Locks			X	X
<b>4.00</b>	<b>Module Windows</b>				
4.10	Window Frames	X	X		
4.20	Window Glazing	X	X		
<b>5.00</b>	<b>Module Insulation</b>				
5.10	Insulation	X	X		
<b>6.00</b>	<b>Module Finish Coatings</b>				
6.10	Module Interior Finish Coatings	X	X		
6.20	Dayroom Side of Module (Prime Painted)	X	X		
6.30	Module Door (Prime Painted)	X	X		
<b>7.00</b>	<b>Module Furnishings</b>				
7.10	Module Bunks	X	X		
7.30	Module Mirrors	X	X		
7.40	Module Shelf, Hooks, Seat, Desk	X	X		
7.50	Day Room Furniture			X	X
7.60	CCTV Monitor Frame and Glazing			X	X
7.70	CCTV Monitor Bracket			X	X
7.80	Camera and Wiring			X	X

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
<b>8.00</b>	<b>Plumbing Equipment and Fixtures</b>				
8.10	Module Combination Toilet/Lavatory Units	X	X		
8.20	Handicap Cell Toilets and Lavatories T4	X	X		
8.3	Supply of, or Connection to Building Plumbing			X	X
8.4	Module Mechanical Chase Pressure Piping			X	X
8.5	Module Fixture Flush Valves			X	X
8.6	Module Fixture Manifold Valves and Tubing	X			X
8.7	Dayroom Penal Plumbing Fixtures			X	X
8.8	Dayroom Shower Fixtures			X	X
8.9	Module Sprinkler Heads			X	X
8.9a	Prep for Sprinkler	X	X		
8.9b	Sprinkler System Piping	X	X		
<b>9.00</b>	<b>Electrical and Lighting</b>				
9.1	Surface Mounted Module Light Fixtures	X	X		
9.2	Module Light Fixtures LED Lamps	X	X		
9.3	Electrical back boxes and Conduit Terminated in Junction Boxes in Access Chase	X	X		
9.4	Electrical Wiring from Light Fixtures Junction Boxes	X	X		
9.5	Final Connection to Building Electrical			X	X

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
9.6	Communication System Conduit and Back Boxes	X	X		
9.7	Communication Equipment and Wiring			X	X
<b>10.0</b>	<b>HVAC</b>				
10.2	Sleeve at Module Grilles for Duct Connection	X	X		
10.3	Sleeve at Module Roof for Duct Connection			N/A	N/A
10.4	Module Chase HVAC Duct			X	X
<b>11.0</b>	<b>Mezzanine</b>				
11.1	Front Module Mezzanine Walkway			X	X
11.2	Rear Module Mezzanine Walkway			N/A	N/A
<b>12.0</b>	<b>Module Installation</b>				
12.1	Shim Packs for Module Setting/Leveling	X			X
12.2	Provision of Suitable Site Surface Preparation for Access of Module Transportation Trucks			X	X
12.3	Deliver Modules	X	X		
12.4	Crane to Off-Load Cells			X	X
12.5	Rigging to Off-Load Cells			X	X
12.6	Off-Load Modules			X	X
12.7	Install Modules			X	X
12.8	Weld Modules to Anchors/Shims			X	X

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
12.9	Masonry Anchors/Brackets			NA	NA
12.10	Installation of Module to Wall Closure Plates	X			X
12.11	Installation of Module to Module Closure Plates	X			X
12.12	Installation of Chase Front and Door	X	X		
12.13	Security Sealant between Module and Floor			X	X
12.14	On-Site Protection of Modules			X	X
<b>13.0</b>	<b>Taxes and Bonding</b>				
13.1	Taxes			X	X
13.2	Bond			X	X

END OF SECTION 135500