



NEW FAYETTE COUNTY PRISON MULTI PRIME

245 McClellandtown Road
Uniontown, PA 15401

VOLUME 02: Sections 03-14
PROJECT NO. 20-1737

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**SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.03 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 04 2001 - Masonry Veneer: Spacing for veneer anchor reglets recessed in concrete.

1.04 REFERENCE STANDARDS

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- D. ACI 347R - Guide to Formwork for Concrete.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- G. PS 1 - Structural Plywood.

1.05 SUBMITTALS

- A. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
- B. Designer's Qualification Statement.
- C. Design Data: As required by authorities having jurisdiction.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.
- B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- D. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

2.02 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.

2.03 REMOVABLE PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gauge, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Preformed Aluminum Forms: ASTM B221 (ASTM B221M), 6061-T6 alloy, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- D. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.04 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
- C. Dovetail Anchor Slot: Galvanized steel, at least 22 gauge, 0.0299 inch thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- D. Flashing Reglets: Galvanized steel, at least 22 gauge, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- F. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.

PART 3 EXECUTION

3.01 EARTH FORMS

- A. Earth forms are not permitted.

3.02 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.

3.03 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04 2001.
- E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.05 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.

3.06 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.07 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.08 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

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**SECTION 03 2000
CONCRETE REINFORCING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 04 2000 - Unit Masonry: Reinforcement for masonry.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems: Grounding connection to concrete reinforcement.

1.04 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- C. ACI SP-66 - ACI Detailing Manual.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- F. CRSI (DA4) - Manual of Standard Practice.
- G. CRSI (P1) - Placing Reinforcing Bars.

1.05 SUBMITTALS

- A. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- B. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- C. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.06 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
 - 2. WWR Style: As indicated on drawings.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice, ACI SP-66 - ACI Detailing Manual, and ACI 318.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place reinforcement in accordance with CRSI (DA4) - Manual of Standard Practice, ACI 301, and ACI 318 .
- B. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- C. Do not displace or damage vapor barrier. Repair damage and reseal vapor barrier before placing concrete.
- D. Comply with applicable code for concrete cover over reinforcement, unless a greater cover is indicated on the structural drawings.
- E. Set wire ties with ends directed into concrete, not towards concrete surfaces.
- F. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Lap edges and ends of adjoining sheets at least one full mesh. Splice laps with tie wire.
- G. Bond and ground all reinforcement to requirements of Section 26 0526.

3.02 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section {CH#53401}, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Concrete walls.
- B. Concrete toppings.
- C. Floors and slabs on grade.
- D. Concrete foundations and piers.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, including equipment pads.
- G. Concrete curing.

1.03 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- D. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- E. Section 31 2323 - Fill: Drainage fill under slabs-on-grade.

1.04 REFERENCE STANDARDS

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- C. ACI 301 - Specifications for Structural Concrete.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- F. ACI 305R - Guide to Hot Weather Concreting.
- G. ACI 306R - Guide to Cold Weather Concreting.
- H. ACI 308R - Guide to External Curing of Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- J. ACI 347R - Guide to Formwork for Concrete.
- K. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

- O. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- P. ASTM C150/C150M - Standard Specification for Portland Cement.
- Q. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
- R. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- S. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
- T. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- U. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- V. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- W. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- X. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- Y. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
- Z. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
- AA. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- BB. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- CC. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
- DD. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- EE. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
- FF. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric).
- GG. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- HH. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- II. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- JJ. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- KK. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
 - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - a. Each mix design shall indicate 28 day compressive strengths, cement content, air content, water-cement ratio, amount of fine and coarse aggregates, and admixtures.
 - b. Indicate amounts of mixing water to be withheld for later addition at the Project site.
 - c. Provide back-up test data complying with ACI requirements for each concrete mixture design.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.
- E. Samples: Submit samples of underslab vapor retarder to be used.
- F. Test Reports: Submit report for each test or series of tests specified.
- G. Qualification Data: For Installer, manufacturer, and testing agency.
- H. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with the requirements:
 - 1. Aggregates.
- I. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

1.06 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Installer Qualifications: A qualified installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
- F. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician - Grade I..
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I.
 - 3. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- G. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.

1. Acquire aggregates for entire project from same source.
 2. Maximum Coarse-Aggregate Size: 1 inch nominal.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Calcined Pozzolan: ASTM C618, Class N.
- E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.02 FIBER REINFORCEMENT

- A. Synthetic Micro-Fiber: Alkali-resistant fibrillated polypropylene micro-fibers engineered and designed for use in concrete complying with ASTM C1116/C1116M, Type III.
1. Fiber Length: 1/2 to 1-1/2 inches, nominal.

2.03 ADMIXTURES

- A. Provide admixtures certified by manufacturer to be compatible with other admixtures.
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C260/C260M.
- D. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- E. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- F. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- G. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- H. Accelerating Admixture: ASTM C494/C494M Type C.
- I. Retarding Admixture: ASTM C494/C494M Type B.
- J. Water Reducing Admixture: ASTM C494/C494M Type A.
- K. Moisture Vapor Reduction Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.

2.04 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, sheet material complying with ASTM E1745, Class A not less than 15 mils thick; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 2. Permeance: 0.01 perms per ASTM F1249 after mandatory conditioning tests per ASTM E154 Sections 8, 11, 12, and 13
 3. Products: Subject to compliance with the requirements, provide one of the following:
 - a. Insulation Solutions, Inc; Viper VaporCheck II 15-mil (Class A).
 - b. Stego Industries, LLC; Stego Wrap Vapor Barrier 15-mil (Class A).
 - c. Sundance VB Inc.; Sundance VB
 - d. W.R. Meadows, Inc.; PERMINATOR Class A - 15 mils.

2.05 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
1. Complying with ASTM C881/C881M and of Type required for specific application.

- a. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- B. Waterstops: PVC, complying with COE CRD-C 572.
- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
 - 1. Material: ASTM D1751, cellulose fiber.

2.06 CURING MATERIALS

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
 - 1. Manufacturers:
 - a. BASF Construction Chemicals - Building Systems; Confilm.
 - b. Euclid Chemical Company ; EUCOBAR: www.euclidchemical.com/#sle.
 - c. L&M Construction Chemicals, Inc.; E-CON.
 - d. Sika Corporation; SikaFilm.
 - e. W. R. Meadows, Inc ; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.
 - f. Substitutions: Not permitted.
- B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
 - 1. Product dissipates within 7 to 10 days.
 - 2. Provide product containing fugitive red dye.
- C. Curing and Sealing Compound, Moisture Emission-Reducing, Membrane-Forming: Liquid, membrane-forming, clear sealer, for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.
- D. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
 - 1. Application: Use at exposed concrete floors.
 - 2. Vehicle: Solvent-based.
 - 3. Solids by Mass: 25 percent, minimum.
 - 4. VOC Content: OTC compliant.
 - 5. Manufacturers:
 - a. Euclid Chemical Company; SUPER DIAMOND CLEAR: www.euclidchemical.com/#sle.
 - b. Kaufman Products Inc; Krystal 25 OTC, or Krystal 25 Emulsion: www.kaufmanproducts.net/#sle.
 - c. L&M Dress & Seal, www.laticrete.com/#sle.
 - d. Surface Koatings, Inc; 2500 LV UV: www.surfkoat.com/#sle.
 - e. W. R. Meadows, Inc; CS-309 OTC: www.wrmeadows.com/#sle.
 - f. Substitutions: Not permitted.
- E. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, white opaque color.
- F. Water: Potable, not detrimental to concrete.

2.07 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 - 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
 - 5. Silica Fume: 10 percent.
 - 6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
 - 7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
 - 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious material ratio below 0.50.
- F. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Cement Content: As indicated on drawings.
 - 3. Water-Cement Ratio: As indicated on drawings.
 - 4. Total Air Content: As indicated on drawings, determined in accordance with ASTM C173/C173M.
 - 5. Maximum Slump: As indicated on drawings.

2.08 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

- C. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 INSTALLING EMBEDDED ITEMS

- A. Verify that anchors, seats, plates, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.04 PLACING CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Place concrete in accordance with ACI 304R.
- C. Place concrete for floor slabs in accordance with ACI 302.1R.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- F. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- G. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, provide as indicated on plan; before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- H. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below. Deposit and consolidate concrete for floors and slabs in a uniform and continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Add additional concrete during placement operations to provide slab surfaces at correct, finished floor, and top of slab elevations indicated to account for framing members, including cambered and non-cambered members, deflecting below top of steel elevations indicated.
 5. Slope surfaces uniformly to drains where required.
 6. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- I. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. 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.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- J. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.05 SLAB JOINTING

- A. Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Locate joints as indicated on drawings.
- C. Anchor joint fillers and devices to prevent movement during concrete placement.
- D. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Construction Joints: Install per typical details on the structural drawings so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- F. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool and develop random contraction cracks, when cutting action will not tear, abrade, or otherwise damage surface; use 1/8 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
 - 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
 - 2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
 - 3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
 - 4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
 - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
 - 3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.08 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Equipment Bases and Foundations: Concrete bases and foundations shall be provided by the contractor requiring them. Comply with requirements below.
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct concrete bases to a height as required by equipment manufacturer but not less than 4 inches; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated 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. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.09 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 1. Normal concrete: Not less than seven days.
- C. Surfaces Not in Contact with Forms:
 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
 - b. Spraying: Spray water over floor slab areas and maintain wet.
 - c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Test repair technique on a mock-up or surface to be concealed later and obtain Architect's approval prior to repairing surfaces.
- D. 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. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. 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 will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- E. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include 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.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- G. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4533 - Code-Required Special Inspections and Procedures.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests and inspections of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

- E. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Headed bolts and studs.
 - 3. Verification of use of the required design mixture.
 - 4. Concrete placement, including conveying and depositing.
 - 5. Curing procedures and maintenance of curing temperature.
- F. Concrete Tests: Water may not be added to the concrete after the sample is taken. Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to 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 will provide 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. Compression Test Specimens: ASTM C31/C31M.
 - a. Cast and laboratory cure standard cylinder specimens for each composite sample for specimen size indicated as follows:
 - 1) 6"x12": 5 specimens
 - 2) 4"x8": 8 specimens
 - b. Provide specimens of the same size throughout the course of the Project.
 - 3. Compressive-Strength Tests: ASTM C39/C39M; test laboratory-cured specimens at 7 days and 28 days as indicated for specimen size. Extra cylinders will be broken, if necessary, at a time directed by the Architect.
 - a. 6"x12": Two specimens at 7 days and two specimens at 28 days.
 - b. 4"x8": Three specimens at 7 days and three specimens at 28 days.
 - c. A compressive-strength test shall be the average compressive strength from a set of specimens obtained from same composite sample and tested at age indicated.
 - 4. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.12 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.13 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

**SECTION 03 3511
CONCRETE FLOOR FINISHES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Surface treatments for concrete floors and slabs.
- B. Dry shake hardeners.
- C. Clear penetrating sealers.

1.03 RELATED REQUIREMENTS

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

1.04 ADMINISTRATIVE REQUIREMENTS

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

1.05 SUBMITTALS

- A. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- B. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.06 MOCK-UP

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Mock-Up Size: 10 feet square.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 CONCRETE FLOOR FINISH APPLICATIONS

- A. Dry Shake Hardener:
- B. Penetrating Clear Sealer:
 - 1. Use at following locations: Where indicated on the drawings in the finish schedule.

2.02 DENSIFIERS AND HARDENERS

- A. Dry Shake Hardener: Premixed dry powder for spreading on and working into concrete surface prior to set.

2.03 COATINGS

- A. Penetrating Sealer: Transparent, nonyellowing, water-based coating.
 - 1. Composition: Silane-siloxane mixture.
 - 2. Products:
 - a. Clemons Concrete Coatings; Super Seal M: www.clemonsconcretecoatings.com/#sle.
 - b. Concrete Sealers USA; PS110: www.concretesealersusa.com/#sle.
 - c. L&M Construction Chemicals, Inc.; Aquapel Plus: www.lmcc.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 GENERAL

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

3.03 COATING APPLICATION

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.
- D. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

END OF SECTION

**SECTION 03 4100
PRECAST STRUCTURAL CONCRETE**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SUMMARY

- A. This section includes the performance criteria, materials, production, and erection of structural precast and precast, prestressed concrete for the entire project. The work performed under this Section includes all labor, material, equipment, related services, and supervision required for the manufacture and erection of the structural precast and precast, prestressed concrete work shown on the Contract drawings.

1.03 SECTION INCLUDES

- A. Hollow-core slab units.
- B. Grout packing.
- C. Connection and supporting devices.

1.04 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Cast-in-place concrete topping on precast structural concrete.
- B. Section 07 8400 - Firestopping: Joint filler materials for fire-resistance-rated construction.
- C. Section 07 9005 - Joint Sealers: Elastomeric joint sealance and sealant backings.

1.05 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- B. ASTM A27/A27M - Standard Specification for Steel Castings, Carbon, for General Application; Latest edition.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- D. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; Latest edition.
- E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; Latest edition.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; Latest edition.
- G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; Latest edition.
- I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength; Latest edition.
- J. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; Latest edition.
- K. ASTM A416/A416M - Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete.
- L. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement; Latest edition.

- M. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; Latest edition.
- N. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; Latest edition.
- O. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; Latest edition.
- P. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- Q. ASTM A675/A675M - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties; Latest edition.
- R. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; Latest edition.
- S. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; Latest edition.
- T. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- U. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; Latest edition.
- V. ASTM C33/C33M - Standard Specification for Concrete Aggregates; Latest edition.
- W. ASTM C150/C150M - Standard Specification for Portland Cement.
- X. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; Latest edition.
- Y. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; Latest edition.
- Z. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; Latest edition.
- AA. ASTM C567/C567M - Standard Test Method for Determining Density of Structural Lightweight Concrete; Latest edition.
- BB. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; Latest edition.
- CC. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; Latest edition.
- DD. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; Latest edition.
- EE. ASTM C989/C989M - Standard Specifications for Slag Cement for Use in Concrete and Mortars; Latest edition.
- FF. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testings Agency Evaluation; Latest edition.
- GG. ASTM C1107/C1107M - Standard Specification for Packaged, Dry Hydraulic-Cement Grout (Nonshrink); Latest edition.
- HH. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete; Latest edition.
- II. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; Latest edition.
- JJ. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; Latest edition.

- KK. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness; Latest edition.
- LL. ASTM E119 - Standard Test Methods for Fire Tests of Building and Construction Materials; Latest edition.
- MM. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; Latest edition.
- NN. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use; Latest edition.
- OO. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- PP. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.
- QQ. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.
- RR. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete.
- SS. PCI MNL-124 - Design for Fire Resistance of Precast Prestressed Concrete.
- TT. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction.
- UU. UL (FRD) - Fire Resistance Directory.

1.06 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a pre-installation conference one week prior to commencing work of this section.
 - 1. Discuss limitations, if any, on field cutting of openings.

1.07 SUBMITTALS

- A. Product Data: Indicate standard component configurations, design loads, deflections, cambers, and bearing requirements.
- B. Design Mixes: Provide back-up test data conforming to ACI requirements for each concrete mix.
- C. Shop Drawings: Detail fabrication and installation of precast structural concrete units. Indicate layout, unit locations, plans, elevations, fabrication details, unit identification marks, shapes, cross sections, reinforcement including special reinforcement, integral insulation, insulated panel system connectors, connection details, support items, dimensions, openings, and relationship to adjacent materials. Indicate design loads, deflections, cambers, bearing requirements, and special conditions.
 - 1. Indicate welded connections by AWS standard symbols and show size, length, and type of each weld. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints, including accessories.
 - 2. Indicate locations and details of anchorage devices to be embedded in other construction.
 - 3. Include and locate openings larger than by 10 inches.
 - 4. Indicate shim sizes and grouting sequence.
 - 5. Shop Drawings shall be prepared by or under the direct supervision of qualified Professional Engineer.
- D. Provide handling procedures, sequence of erection, and bracing plan.
- E. Design Calculations: Comprehensive engineering analysis signed and sealed by the qualified Professional Engineer responsible for its preparation, submitted for Owner's records. Include cover letter signed and sealed by responsible engineer indicating building code and design criteria used for analysis and stating that analysis was performed by or under his or her direct supervision.
 - 1. Include calculated fire-resistance analysis.

- F. Welding Certificates: Copies of certificates for welding procedures and personnel.
- G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - 1. Provide a current Certificate of Compliance, furnished by PCI, designating qualification listed in "Quality Assurance" for Erector and Fabricator.
- H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Concrete materials.
 - 2. Reinforcing materials and prestressing tendons.
 - 3. Admixtures.
 - 4. Bearing pads.
 - 5. Structural steel shapes and hollow structural sections used for headers.

1.08 QUALITY ASSURANCE

- A. Designer Qualifications: Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.
- B. Erector Qualifications: An experienced erector who has completed precast structural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 - 1. Participates in PCI's Erector Qualification/Certification program and is designated a PCI-qualified erector for Category S1 (Simple Structural Systems) for horizontal decking members and single-lift wall panels.
- C. Fabricator Qualifications: A firm that complies with the following requirements and is experienced in manufacturing precast structural concrete units similar to those indicated for this Project and with a record of successful in-service performance.
 - 1. Assumes responsibility for designing precast concrete structural units and connections to comply with performance requirements. This responsibility includes preparation of Shop Drawings and design calculations by a qualified professional engineer.
 - 2. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group C, Category C2 – Prestressed Hollow-Core and Repetitive Products.
 - 3. Has sufficient production capacity to produce required units without delaying the Work.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated.
- E. Design Standards: Comply with ACI 318 and the design recommendations of PCI MNL 120, "PCI Design Handbook--Precast and Prestressed Concrete."
- F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and camber and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products."
 - 1. Comply with camber and dimensional tolerances of PCI MNL 135, "Tolerance Manual for Precast and Prestressed Concrete Construction."
- G. Welder Qualifications: Qualified within previous 12 months in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.
- H. Calculated Fire Resistance: Where indicated, provide precast structural concrete units whose fire resistance has been calculated according to PCI MNL 124, "Design for Fire Resistance of

Precast Prestressed Concrete," and is acceptable to authorities having jurisdiction.

- I. Fire-Test-Response Characteristics: Provide precast structural concrete units that comply with the following requirements:
 1. Fire-response testing was performed by UL, or another testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
 2. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," or from the listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E 119.
 3. Products are identified with appropriate markings of applicable testing and inspecting agency.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver precast structural concrete units to Project site in such quantities and at such times to ensure continuity of installation.
- B. Support units during shipment on nonstaining shock-absorbing material in same position as during storage.
- C. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distorting, 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.
- D. Handle and transport precast members in position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage. Lift and support only from support points.
- E. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
- F. Protect members to prevent staining, chipping, or spalling of concrete.
- G. Mark each member with date of production and final position in structure.

1.10 SEQUENCING

- A. Furnish loose connections and anchorage items to be embedded in other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Structural Precast Concrete:
 1. Any manufacturer holding a PCI Group C Plant Certification for the types of products specified; see www.pci.org/find/manufacture.

2.02 PRECAST UNITS

- A. Precast Structural Concrete Units: Comply with PCI MNL-116, PCI MNL-120, PCI MNL-123, PCI MNL-135, ACI 318 and applicable codes.
- B. Structural Performance: Provide precast structural concrete units and connections, including connections to support framing and/or foundations, capable of withstanding design loads and erection forces within limits and under conditions indicated including, but not limited to, indicated building code and design criteria.
 1. Loads: As indicated on Structural Drawings.

2. Calculate structural properties of framing members in accordance with ACI 318.
3. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with strength requirements.
4. Fire Resistance: Provide designs tested to provide ratings as follows:
 - a. As indicated on the Architectural Drawings.
5. Design members exposed to the weather to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.
6. Design system and connections to accommodate fabrication and construction tolerances, deflection of other building structural members, accommodate live load deflection, shrinkage and creep of primary building structure, other building movements and clearances of intended openings. Member deflections shall meet the limits of ACI 318.

2.03 MOLD MATERIALS

- A. Molds: Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is nonreactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for 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 treatments of precast concrete.

2.04 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type III, of same type, brand, and source.
 1. For surfaces exposed to view in finished structure, use gray, same type brand, and mill source throughout the precast concrete production.
- B. Standard gray Portland cement may be used for non-exposed backup concrete.
- C. Supplementary Cementitious Materials:
 1. Fly Ash: ASTM C618, Class C or F.
 2. Metakaolin Admixture: ASTM C618, Class N.
 3. Silica Fume Admixture: ASTM C1240.
 4. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.
- D. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C33, with coarse aggregates complying with Class 5S. Provide and stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
 1. Nominal Maximum Aggregate Size: 3/4-inch.
- E. 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.
- F. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.
- G. Chemical Admixtures: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C494, Type A.
 2. Retarding Admixture: ASTM C494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494, Type G.
 6. Plasticizing Admixture: ASTM C1017.

2.05 REINFORCEMENT

- A. Tensioning Steel Tendons: ASTM A416/A416M, Grade 250 (1725); seven-wire stranded steel cable; low-relaxation type; full length without splices; weldless; uncoated.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A706 deformed.
- D. Steel Wire: ASTM A1064/A1064M plain type or deformed type; unfinished.
- E. Steel Welded Wire Reinforcement: ASTM A1064/A1064M plain type or deformed type; in flat sheets; unfinished.
- F. Epoxy-Coated-Steel Welded Wire Fabric: ASTM A884, Class A coated, plain.
- G. Supports: Manufacturer's bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place according to CRSI's "Manual of Standard Practice," PCI MNL 116, and as follows:
 - 1. For uncoated reinforcement, use all-plastic, CRSI Class 1 plastic-protected, or CRSI Class 2 stainless-steel bar supports.

2.06 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A36.
- B. Carbon-Steel Headed Studs: ASTM A108, AISI 1018 through AISI 1020, cold finished; AWS D1.1, Type B, with arc shields.
- C. Carbon-Steel Plate: ASTM A283.
- D. Malleable Steel Castings: ASTM A47.
- E. Carbon-Steel Castings: ASTM A27, Grade 60-30.
- F. High-Strength, Low-Alloy Structural Steel: ASTM A572.
- G. Carbon-Steel Structural Tubing: ASTM A500, Grade B.
- H. Wrought Carbon-Steel Bars: ASTM A675, Grade 65.
- I. Deformed-Steel Wire or Bar Anchors: ASTM A496 or ASTM A706.
- J. Carbon-Steel Bolts and Studs: ASTM A307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A563; and flat, unhardened steel washers, ASTM F844.
- K. High-Strength Bolts and Nuts: ASTM A325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A563; and hardened carbon-steel washers ASTM F436.
- 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 A123, after fabrication, and ASTM A153, as applicable typical except provide electrodeposition according to ASTM B633, SC 3 for threaded fasteners.
 - 1. 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-21035A 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 FS TT-P-664 according to SSPC-PA 1.
- N. Welding Electrodes: Comply with AWS standards.

- O. Accessories: Provide clips, hangers, plastic shims, and other accessories required to install precast structural concrete units.

2.07 BEARING PADS

- A. Provide bearing pads for precast structural concrete units as recommended by the 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, 50 to 70 Shore A durometer according to ASTM D2240, minimum tensile strength 2250 psi per ASTM D412.
 - 2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer. Capable of supporting a compressive stress of 3000 psi with no cracking, splitting or delaminating in the internal portions of the pad. Test one specimen for each 200 pads used in the Project.

2.08 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C150, Type I, and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, of consistency suitable for application.
- C. Epoxy Grout: ASTM C881, 2-component epoxy resin, of type, grade, and class to suit requirements.

2.09 CONCRETE MIXES

- A. Prepare design mixes for each type of concrete required.
 - 1. Limit use of fly ash to 25 percent replacement of portland cement by weight, granulated blast-furnace slag to 40 percent of portland cement by weight, and metakaolin and silica fume to 10 percent of portland cement by weight.
- B. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.
- C. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C1218.
- D. Normal-Weight Concrete: Proportion mixes 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 minimum.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.40.
 - 3. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content complying with PCI MNL 116.
- E. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures according to manufacturer's written instructions.
- F. 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 FABRICATION

- A. Comply with fabrication procedures specified in PCI MNL-116.
- B. Maintain plant records and quality control program during production of precast members. Make records available upon request.
- C. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances.
 - 1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's written instructions.
 - 2. Unless forms for precast, prestressed concrete units are stripped before detensioning, design forms so stresses are not induced in precast concrete units because of deformation or movement of concrete during detensioning.
 - 3. Edge and Corner Treatment: Uniformly chamfered or as built in on standard forms.
- D. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.
- E. 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. Do not relocate bearing plates in units unless approved by Architect.
 - 1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1 and AWS C5.4, "Recommended Practices for Stud Welding."
- F. 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.
- G. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.
 - 1. Coordinate with other trades for installation of cast-in items.
- H. Tension reinforcement tendons as required to achieve design load criteria.
- I. Provide required openings with a dimension larger than 10 inches and embed accessories provided under other sections of the specifications, at indicated locations. Smaller holes may be field cut by trades requiring them, as approved by Architect and precast manufacturer.
 - 1. Provide headers of cast-in-place concrete or structural steel shapes as required.
- J. Reinforcement: Comply with recommendations in PCI MNL 116 and CRSI's "Manual of Standard Practice" 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.
 - 2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete-placement operations and consolidation operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required. Completely conceal support devices to prevent exposure on finished surfaces.
 - 3. Place reinforcement to obtain at least the minimum coverage for concrete protection according to ACI 318. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into

- concrete, not toward exposed concrete surfaces.
4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- K. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses.
- L. Prestress tendons for precast structural concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 116.
1. Delay detensioning until concrete has reached at least 70 percent of its compressive strength as established by test cylinders cured under the same conditions as concrete.
 2. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
 3. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.
 4. Protect strand ends and anchorages with bituminous, zinc-rich, or epoxy paint to avoid corrosion and possible rust spots.
- M. 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.
- N. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.
- O. 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."
- P. Comply with ACI 306.1 procedures for cold-weather concrete placement.
- Q. Comply with ACI 305R recommendations for hot-weather concrete placement.
- R. Identify pickup points of precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint casting date on each precast concrete unit on a surface that will not show in finished structure.
- S. 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.

2.11 FINISHES

- A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.
- B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- C. Commercial Finishes:
1. Finish formed surfaces of precast structural concrete as indicated for each type of unit, and as follows:
 - a. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defects are not permitted.

2. Screed finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections.
3. Apply precast manufacturer's recommended finish to precast concrete units that will receive concrete topping after installation.

2.12 FABRICATION TOLERANCES

- A. Conform to fabrication tolerances specified in PCI MNL-135 .
 1. 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 135 and meet Architect's approval.

2.13 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 116 requirements.
 1. Test and inspect self-consolidating concrete according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."
- B. Strength of precast concrete units will be considered deficient if units fail to comply with PCI MNL 116 requirements, including the following:
 1. Units fail to comply with compressive-strength test requirements.
 2. Reinforcement and prestressed tendons of units do not comply with fabrication requirements.
 3. Concrete curing and protection of units against extremes in temperature fail to comply with requirements.
 4. Units are damaged during handling and erecting.
- C. Testing: If there is evidence that the strength of precast concrete units may be deficient or may not comply with PCI MNL 116 requirements, Contractor will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42.
 1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect and precast manufacturer.
 2. Cores will be tested in an air-dry condition per ACI 301 if units will be dry under service conditions.
 3. Strength of concrete for each series of 3 cores will be considered satisfactory if the average compressive strength is equal to at least 85 percent of the 28-day design compressive strength and no single core is less than 75 percent of the 28-day design compressive strength.
 4. Test results will be made in writing on the 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 or units represented by core tests; design compressive strength; type of break; compressive strength at break, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- D. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

- E. Dimensional Tolerances: Units with dimensions smaller or larger than required and not complying with tolerance limits may be subject to additional testing.
 - 1. Precast concrete units with dimensions larger than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to comply with construction conditions.
- F. Defective Work: Precast concrete units that do not comply with requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work and field measurements are as indicated on shop drawings.
- B. Examine substrates and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. 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.

3.02 PREPARATION

- A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.
- B. Deliver anchorage devices that are embedded in or attached to the building foundation before the start of such work. Provide locations, setting diagrams, and templates for the proper installation of each anchorage device.

3.03 ERECTION

- A. Install loose 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. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
 - 2. 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.
 - 3. Align and maintain uniform horizontal and vertical joints, as erection progresses.
 - 4. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
 - 5. Provide and install headers of cast-in-place concrete or structural steel shapes for openings according to hollow-core slab unit or precast double tee fabricator's written recommendations.
 - 6. Maintain temporary bracing in place until final support is provided. Protect members from staining.
 - 7. Provide temporary lateral support to prevent bowing, twisting, or warping of members.
 - 8. Adjust differential camber between precast members to tolerance before final attachment.

- 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 unless approved by Architect and precast manufacturer.
- F. Welding: Comply with applicable AWS D1.1 and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
 - 1. Protect precast concrete structural 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 A780.
 - 3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
 - 4. Visually inspect all welds critical to precast connections. 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. Cast-in-Place Concrete Infill: Provide cast-in-place concrete infill where precast members leave gaps between framing as indicated on contract documents or as required. Cast-in-place concrete shall be brought to proper elevations and shall be same strength as precast concrete.
- I. 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.

3.04 TOLERANCES

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

3.05 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests and inspections, as specified in Section 01 4533 - Code-Required Special Inspections and Procedures.
- B. Field welds and connections using high-strength bolts will be subject to tests and inspections.

- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be per 01 4533 - Code-Required Special Inspections and Procedures formed to determine compliance of corrected work with specified requirements.
- F. Extent of Inspection and Testing:
 - 1. Bolted Connections:
 - a. 100 percent of field-bolted connections shall be visually inspected.
 - 2. Welded Connections:
 - a. 100 percent of field-welded connections shall be visually inspected.
 - b. 100 percent of partial penetration and full penetration type field-welded connections shall be tested by ultrasonic or radiographic inspection.
 - c. 100 percent of any weld suspected of being defective based on visual inspection shall be tested by ultrasonic or radiographic inspection.

3.06 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.
 - 2. The Architect reserves the right to reject repaired units that do not comply with requirements.
- 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.
- 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.

3.07 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 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.

END OF SECTION

**SECTION 04 2000
UNIT MASONRY**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Concrete block.
- B. Decorative concrete block.
- C. Ceramic glazed concrete block.
- D. Mortar and grout.
- E. Reinforcement and anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.

1.03 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Dovetail slots for masonry anchors.
- B. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- C. Section 03 3000 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- D. Section 05 1200 - Structural Steel Framing: Anchor sections of adjustable masonry anchors for connecting to structural frame.
- E. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- F. Section 07 1113 - Bituminous Dampproofing: Dampproofing masonry surfaces.
- G. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.
- H. Section 07 2500 - Weather Barriers: Water-resistive barriers or air barriers applied to the exterior face of the backing sheathing or masonry.
- I. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- J. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.04 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- G. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry.

- H. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- I. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
- J. ASTM C91/C91M - Standard Specification for Masonry Cement.
- K. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
- L. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
- M. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
- N. ASTM C150/C150M - Standard Specification for Portland Cement.
- O. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- P. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
- Q. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
- R. ASTM C476 - Standard Specification for Grout for Masonry.
- S. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
- T. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- U. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete.
- V. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength.
- W. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar.
- X. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
- Y. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- Z. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry.
- AA. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing.
- BB. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls.
- CC. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls.
- DD. BIA Technical Notes No. 46 - Maintenance of Brick Masonry.
- EE. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.
- FF. UL (FRD) - Fire Resistance Directory.

1.05 ADMINISTRATIVE REQUIREMENTS

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

1.06 PERFORMANCE REQUIREMENTS

- A.
- B. Determine net-area compressive strength (f'm) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in TMS 402/602.

1.07 SUBMITTALS

- A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

- B. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.
- C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements. Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
 - 1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For exposed brick, include material test report for efflorescence according to ASTM C67/C67M.
 - c. 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.
- D. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- E. 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 C109/C109M for compressive strength and ASTM C91/C91M for air content.
 - 2. Include test reports, per ASTM C1019, 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 TMS 402/602.
- G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- H. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.
- I. Manufacturer's Qualification Statement.
- J. Installer's Qualification Statement.
- K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Glazed Units: 50 of each type, size, and color combination.

1.08 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Fire Rated Assemblies: Comply with applicable code for fire rating design as indicated on the drawings.

- C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- E. Preconstruction Testing Service: Contractor shall engage and pay for a qualified independent testing agency to perform preconstruction testing indicated below.
 - 1. Concrete Masonry Unit Test: For each type of unit required, per ASTM C140/C140M0M for compressive strength.
 - 2. Grout Test (Compressive Strength): For each mix required, per ASTM C1019.

1.09 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. 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.
- C. Handle and store ceramic glazed masonry units in protective cartons or trays. Do not remove from protective packaging until ready for installation.
- D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- E. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- F. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- G. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.11 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 and hold cover securely in place.
 - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 402/602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 402/602.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Performance Requirements:
1. Provide structural unit masonry that develops indicated net-area compressive strengths (f_m) at 28 days.
 2. Determine net-area compressive strength (f_m) of masonry from average net-area compressive strengths of masonry and mortar type (unit-strength) according to Tables 1 and 2, TMS 402/602.
- B. Concrete Block: Comply with referenced standards and as follows:
1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, and jambs.
 - a. Provide bullnose units for outside corners.
 3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
 - b. Hollow block, as indicated.
 - c. Exposed Faces: Manufacturer's standard color and texture.
 4. Non-Loadbearing Units: ASTM C129.
 - a. Hollow block, as indicated.
 5. Provide solid units with uniform exposed surfaces where corbels or racking would expose cores or unfinished surfaces.
 6. Decorative CMUs: ASTM C90, hollow block, normal weight.
 - a. Exposed Faces: Special color and texture, as follows: decorative CMU units.
 - b. Size: Manufactured to dimensions herein specified.
 - c. Pattern and Texture:
 - 1) Standard pattern: ground-face finish.
 - 2) Accent pattern: split-face finish
 - d. Colors: As indicated on the drawings.
 - e. Provide units with integral water repellent as herein specified.
 7. Units with Integral Water Repellent: Concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.

- a. Performance of Units with Integral Water Repellent:
 - 1) Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours.
 - (a) No water visible on back of wall above flashing at the end of 24 hours.
 - (b) No flow of water from flashing equal to or greater than 0.032 gallons per hour at the end of 24 hours.
 - (c) No more than 25 percent of wall area above flashing visibly damp at end of test.
 - 2) Flexural Bond Strength: ASTM C1072; minimum 10 percent increase.
 - 3) Compressive Strength: ASTM C1314; maximum 5 percent decrease.
 - 4) Drying Shrinkage: ASTM C1148; maximum 5 percent increase in shrinkage.
 - b. Use only in combination with mortar that also has integral water repellent admixture.
 - c. Use water repellent admixtures for masonry units and mortar by a single manufacturer.
- C. Ceramic Glazed Concrete Masonry Units:
- 1. Pre-faced Surfaces:
 - a. Interior Use: Smooth, colored satin finish conforming to ASTM C744
 - 2. Concrete Block for Glazing: ASTM C90 for hollow and solid load-bearing units; Type 1 (moisture controlled).
 - 3. Glazed Face Sizes & Joints: Modular 8"x16", 4"x16", 8"x8", 12"x12", 16"x16" including 1/4" exposed face joints; sizes as shown; long dimensions, horizontal or vertical as shown.
 - 4. Color and texture to match Architect's sample.
 - 5. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn without chipping to produce equivalent effect.
 - 6. Manufacturers:
 - a. Oldecastle Echelon Masonry; Trenwyth® Astra-Glaze-SW+®: [www.https://www.echelonmasonry.com](http://www.echelonmasonry.com).
 - b. Spectra-Glaze; Spectra-Glaze® II Units: www.spectraglaze.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- D. Grout Aggregate: ASTM C404.
- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 - 1. Color(s): As selected by Architect from manufacturer's full range.
 - 2. Manufacturers:
 - a. Davis Colors, a division of Venator Materials PLC: www.daviscolors.com/#sle.
 - b. Lambert Corporation: www.lambertusa.com/#sle.
 - c. Solomon Colors, Inc: www.solomoncolors.com/#sle.

- d. Lehigh White Cement Company; www.lehighwhitecement.com.
- F. Water: Clean and potable.
- G. Accelerating Admixture: Nonchloride type for use in cold weather.
 - 1. Manufacturers:
 - a. Addiment Incorporated; Mortar Kick.
 - b. Euclid Chemical Company (The); Accelguard 80.
 - c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
 - d. Sonneborn, Div. of ChemRex; Trimix-NCA
- H. Integral Water Repellent Admixture for Mortar: Polymeric liquid or powder admixture added to mortar at the time of manufacture.
 - 1. Use only in combination with masonry units manufactured with integral water repellent admixture.
 - 2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
 - 3. Meet or exceed performance specified for water repellent admixture used in masonry units.
- I. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
 - 1. Color: Mineral pigments added as required to produce approved color sample.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - 2. WIRE-BOND www.wirebond.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; uncoated finish.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss or ladder.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
 - 4. Products:
 - a. Homann & Barnard, Inc. No. 220 Ladder-Mesh reinforcing or comparable product.
 - b. Substitutions: See Section 01 6000 - Product Requirements
- E. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss or ladder, with adjustable ties or tabs spaced at 16 in on center.
 - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
 - 3. Size: 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
 - 4. Vertical adjustment: Not more than 1 1/4 inches.
 - 5. Seismic Feature: Provide lip, hook, or clip on extended leg of wall ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch

- diameter.
6. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.
 7. Products:
 - a. Homann & Barnard, Inc., 270 Ladder Lox-All Adjustable Eye-Wire.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
 1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.024 in thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - a. Product:
 - 1) Homann & Barnard, Inc; 305 Dovetail Slot with 315 Flexible Dovetail Brick Tie.
 - 2) WIRE-BOND; 1304 Dovetail Slot with 2102 Dovetail Triangular Tie.
 - G. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 3. Vertical adjustment: Not less than 3-1/2 inches.
 4. Products:
 - a. Homann & Barnard, Inc., X-Seal Anchor with with H&B VBT - Vee Byna-Tie.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - H. Partition Top Anchors: 12-gage steel channel with slot to allow movement and 12 gage strap designed for channel. Fabricate from steel, hot-dip galvanized after fabrication. Provide products by one of the following:
 1. Hohmann & Barnard, Inc.; PTA 420 HS.
 2. Substitutions: See Section 01 6000 - Product Requirements.

2.04 FLASHINGS

- A. Metal Flashing Materials:
 1. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gauge, 0.0187 inch thick; finish 2B to 2D.
- B. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
 1. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: www.h-b.com/#sle.
 - 2) York Manufacturing, Inc; Multi-Flash SS: www.yorkmfg.com/#sle.
 - 3) Substitutions: See Section 01 6000 - Product Requirements.
- C. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc; Stainless Steel Corners and End Dams: www.h-b.com/#sle.
 - b. Mortar Net Solutions; CompleteFlash: www.mortarnet.com/#sle.
 - c. York Manufacturing, Inc; SS Corners/End Dams: www.yorkmfg.com/#sle.
- D. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.

- E. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.05 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Advanced Building Products Inc; Mortar Break: www.advancedbuildingproducts.com/#sle.
 - 2) Mortar Net Solutions; MortarNet: www.mortarnet.com/#sle.
 - 3) York Manufacturing, Inc; Weep-Net: www.yorkmfg.com/#sle.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- C. Weeps:
 - 1. Type: Molded PVC grilles, insect resistant.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Advanced Building Products, Inc; Mortar Maze Weep Vents: www.advancedbuildingproducts.com/#sle.
 - b. Hohmann & Barnard, Inc; 342 Rectangular Plastic Weep Hole: www.h-b.com/#sle.
 - c. Mortar Net Solutions; WeepVent: www.mortarnet.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Cavity Vents:
 - 1. Type: Molded PVC grilles, insect resistant.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Blok-Lok Limited: www.blok-lok.com/#sle.
 - b. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - c. Mortar Net Solutions; CellVent: www.mortarnet.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
- F. Cleaning Product for Glazed Concrete Block: Use masonry detergent cleaners as recommended by the glazed block manufacturer. Do not use any product containing unbuffered hydrochloric acid or other unbuffered acids.

2.06 LINTELS

- A. General: Provide lintels as scheduled on contract documents.
- B. Bond Beam Masonry Lintels: Built-in-place masonry lintels made from standard "U" bond beam concrete masonry units bearing on fully grouted block with horizontal reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.
 - 1. Fill with grout, rod to maximum compaction, and cure for 28 days before removing temporary supports.
 - 2. Wall above may be placed provided temporary supports are capable of supporting load or after lintel has cured for 28 days.

2.07 MORTAR AND GROUT MIXING

- 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.
 - 3. Limit cementitious materials in mortar for exterior masonry to portland cement and lime.
 - 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- 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: ASTM C270, using the Proportion Specification.
 - 1. Masonry below grade and in contact with earth: Type M.
 - 2. Exterior, loadbearing masonry: Type S.
 - 3. Exterior, non-loadbearing masonry: Type S.
 - 4. Interior, loadbearing masonry: Type S.
 - 5. Interior, non-loadbearing masonry: Type N.
 - 6. For reinforced masonry, use Type S.
- D. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- E. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
 - 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 TMS 402/602 for dimensions of grout spaces and pour height.
 - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.
- F. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- G. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 COLD AND HOT WEATHER REQUIREMENTS

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

3.04 COURSING

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

3.05 PLACING AND BONDING

- A. 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.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
 - 1. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 2. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 3. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. 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. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- E. 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. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around anchors. Space anchors 48 inches o.c., unless otherwise indicated.
 - 3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with rated assembly.
- F. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- G. Remove excess mortar and mortar smears as work progresses.
- H. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- I. Interlock intersections and external corners.
- J. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- K. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- L. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, or epoxy paint scheduled in the kitchen.
- M. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- N. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHER MASONRY, AND CAVITY WALL MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches.
- F. Reinforce joint corners and intersections with strap anchors 16 inches on center.
- G. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- H. Provide continuity at wall intersections by using prefabricated T-shaped units.
- I. Provide continuity at corners by using prefabricated L-shaped units.
- J. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.
 - 1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.
- K. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.10 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - 1. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
 - 2. Terminate vertical leg of flashing into bed joint in masonry or reglet in concrete.
 - 3. Apply cap bead of sealant on top edge of self-adhered flashing.
- C. Install flashing in accordance with manufacturer's instructions.
- D. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- E. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Attached web covers will span from pan to pan providing protection over the web and the joints of the CMU.
- F. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 LINTELS

- A. Install scheduled lintels over openings.

3.12 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Form expansion joint as detailed on drawings.
- D. Provide control joints at the following location and in accordance with National Concrete Masonry Association TEK 10-2B unless otherwise indicated.
 - 1. At changes in wall height.
 - 2. At changes in wall thickness, such as at pipe and duct chases and pilasters.
 - 3. At (above) movement joints in foundations and floors.
 - 4. At (below) movement joints in roofs and floors that bear on a wall.
 - 5. Near one or both sides of door and window openings.
 - 6. Adjacent to corners of walls or intersections within a distance equal to half the control joint spacing.

3.13 BUILT-IN WORK

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

3.14 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4533 - Code-Required Special Inspections and Procedures .
- B. Inspections: Level B assurance according to the "Building Code Requirements for Masonry Structures."
 - 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. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.
- E. Grout Test (Compressive Strength): For each mix required, per ASTM C1019.

3.17 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.
- E. Cleaning of Glazed Concrete Block: Use industrial strength detergents in strict accordance with cleaner manufacturer's instructions, including thorough rinsing. Damp-dry with clean, soft rags. Do not use steel wool, other abrasives or any product containing unbuffered hydrochloric acid or other acids. Do not powerwash.

3.18 PROTECTION

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

END OF SECTION

**SECTION 05 0527
SECURITY METAL FASTENERS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. All exposed fasteners required to finish and install work within all inmate accessible areas, including fasteners used in fabrication of project components, shall be Security Screws as specified herein, unless the component or location is specifically excluded as listed below.
- B. Excluded Items and Locations:
 - 1. Administrative areas.
 - 2. Within mechanical, electrical, generator or communications equipment and rooms, including roof mounted equipment.
 - 3. Control rooms and their attendant equipment in those rooms.
 - 4. Above suspended ceilings, behind access panels, and within pipe or duct chases.
 - 5. Movable furnishings, storage shelving, cabinet hardware.
 - 6. Wall board screws.

1.03 QUALITY ASSURANCE

- A. All security screws shall be operable by tools produced for use on the specified security screws, by the screw manufacturer or other fabricators licensed by them.
- B. Flat screw heads shall be seated flush with adjacent material or be seated slightly into countersunk depressions in each fastened item, but in no case shall any portion of the screw head project out from the fastened item's adjacent face.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Style and Finish: Security screw head style and plating shall be selected as appropriate for installation requirements, strength, and finish of adjacent materials. Size and shape variation shall be such that no more than six different tools/wrenches will be required for all security screws used on the project.
- B. Types Allowed:
 - 1. Pinned "Allen" head.
 - 2. Pinned "Torx" head.
- C. Diameter: #4 through 3/4-inch.
- D. Threads: 28 or 32 threads per inch.
- E. Material: Black grade 9 alloy steel or austenitic stainless steel or martensitic steel as required for particular strength or finish.
- F. Head Styles: Button, flat or low head, as required by application or as indicated.
- G. Plating: Cadmium, Zinc, Nickel, Phosphate and Chrome, to match adjacent materials.
- H. Any deviations of Type and Application used shall be approved prior to installation by Architect.

2.02 TOOLS

- A. Provide 10 complete sets of tools required for each and every type of security screw used on project. Package each set in an individual kit and deliver to Detention Equipment Contractor, who shall be responsible for completeness of inventory of tools and screws.

PART 3 EXECUTION

3.01 RESPONSIBILITY

- A. Security screws as specified herein shall be supplied by the manufacturer, supplier or installer of each component requiring their use. It shall be their responsibility to assure use of proper size and type of Security Screw for each required application. The Contractor shall coordinate with each to assure that quantity of tools/wrenches required does not exceed specified maximum.

3.02 INSTALLATION

- A. Security screw installation shall be the responsibility of whoever installs the screws under this project's application conditions.

END OF SECTION

**SECTION 05 1200
STRUCTURAL STEEL FRAMING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Structural steel framing members.
- B. Structural steel support members.
- C. Base plates, bearing plates.
- D. Grouting under base plates.

1.03 RELATED REQUIREMENTS

- A. Section 05 2100 - Steel Joist Framing.
- B. Section 05 3100 - Steel Decking: Support framing for small openings in deck.
- C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.04 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- F. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- G. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
- H. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- I. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film.
- J. ASTM E94 - Standard Guide for Radiographic Examination.
- K. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
- L. ASTM E709 - Standard Guide for Magnetic Particle Testing.
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- N. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.
- O. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.

1.05 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."

1.06 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.

1.07 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, fasteners, and details of cuts, splices, holes and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Connections. Indicate type, size, and length of bolts, distinguishing between shop and field bolts.
 - 4. Indicate cambers.
 - 5. Indicate welded connections with AWS A2.4 welding symbols distinguishing between shop and field welds. Indicate net weld lengths, size and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
- C. Qualification Data: For erector and fabricator.
- D. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- F. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis, including chemical and physical properties.
- G. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.08 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Fabricator: Company specializing in performing the work of this section with minimum 10 years of documented experience.
- C. Fabricator Qualifications:
 - 1. Is familiar with and performs work in accordance with AISC 303, AISC 360, and OSHA's Steel Erection Standard.
 - 2. Participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- D. Erector: Company specializing in performing the work of this section with minimum 10 years of documented experience.
- E. Erector Qualifications:
 - 1. Is familiar with and performs work in accordance with AISC 303, AISC 360, and OSHA's Steel Erection Standard.
- F. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

- G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1.

1.09 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.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.
1. Select and complete connections using AISC (MAN) and AISC 360.
 2. Use Load and Resistance Factor Design; data are given at factored-load level.
- B. Construction: Shear wall system.

2.02 MATERIALS

- A. Steel Angles, Plates, Channels, S Shapes, and M Shapes: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- D. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type A325 heavy-hex steel structural bolts; ASTM A563, Grade C, plain, heavy-hex carbon steel nuts; and ASTM F436, Type 1, plain, hardened carbon-steel washers.
- E. Headed Anchor Rods: ASTM F1554 Grade 36, plain.
1. Configuration: Straight.
 2. Nuts: ASTM A563, Grade A, plain heavy-hex carbon steel.
 3. Plate Washers: ASTM A36/A36M, plain carbon steel.
 4. Washers: ASTM F436, Type 1, plain hardened carbon steel.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Grout: Non-shrink, non-metallic aggregate type, factory-packaged, complying with ASTM C1107/C1107M noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30 minute working time, and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- H. Shop and Touch-Up Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer, complying with VOC limitations of authorities having jurisdiction, MPI #79, and compatible with topcoat.

2.03 FABRICATION

- A. Shop fabricate to greatest extent possible. Fabricate according to AISC 303 and AISC 360.
1. Fabricate beams with rolling camber up.
 2. Identify high-strength structural steel according to ASTM A6/A6M and maintain markings until structural steel has been erected.

3. Mark and match-mark materials for field assembly.
 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
 - C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
 - D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
 - E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning".
 - F. Holes: Provide holes indicated on structural drawings, if any, required for securing other work to structural steel and for other work to pass through steel members. Holes not indicated on structural drawings are not permitted without written approval from the Structural Engineer.
 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.04 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to AISC S348 "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.
 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.05 FINISH

- A. Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare structural component surfaces in accordance with the following specifications and standards.
 1. SSPC-SP 2, "Hand Tool Cleaning."
 2. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - a. Cleaning method for exposed structural steel.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete or mortar extending primer to a depth of 2 inches for partially embedded items, or galvanized.
- 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments are appropriate for erection of structural steel and that the work may properly proceed.

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.

3.02 ERECTION

- A. Erect structural steel accurately and in locations and to elevations indicated and in compliance with AISC 303 "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Base plates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of base plate as indicated.
 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.
- D. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- E. 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.
- F. Splice members only where indicated.
- G. Do not field cut or alter structural members without approval of Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- I. 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.
- J. 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. 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.
- K. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
- L. Grout solidly between bearing plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4533 - Code-Required Special Inspections and Procedures.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC S348 "Specification for Structural Joints Using ASTM A325 or A490 Bolts", AISC 360 and the project Statement of Special Inspections.
- C. Welded Connections: Visually inspect all field-welded connections according to AWS D1.1/D1.1M and test welds in accordance with the project Statement of Special Inspections using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E94/E94M.
 - 2. Ultrasonic testing performed in accordance with ASTM E164.

END OF SECTION

SECTION 05 2100 STEEL JOIST FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Open web steel joists, with bridging, attached seats and anchors.
- B. Joist accessories.
- C. Supplementary framing for roof openings greater than 12 inches.

1.03 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Superstructure framing.
- B. Section 05 3100 - Steel Decking: Support framing for openings less than 12 inches in decking.
- C. Section 05 5000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.04 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- C. ASTM E94 - Standard Guide for Radiographic Examination.
- D. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
- E. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- G. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.
- H. SJI 100 - Standard Specifications for K-Series, LH-Series, and DLH-Series Open Web Steel Joists, and for Joist Girders.
- I. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders.
- J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- K. SSPC-SP 2 - Hand Tool Cleaning.

1.05 DEFINITIONS

- A. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support non-uniform, unequal, or special loading conditions, including drag forces acting on top chords of joists with slopes greater than 1/2-inch per foot, that invalidate load tables in SJI's "Specifications."

1.06 SUBMITTALS

- A. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, attachments, and splices.
- B. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

- C. Qualification Data: For manufacturer and professional engineer to demonstrate their capabilities and experience. Provide lists of completed projects similar to this project and include project names and addresses, and names and addresses of architects and owners.
- D. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation. Include cover letter signed and sealed by professional engineer indicating building code and design criteria used for analysis and that analysis was performed by or under his or her direct supervision.

1.07 QUALITY ASSURANCE

- A. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.
- B. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 10 years documented experience.
- C. 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.
- D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
- E. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products to SJI requirements.
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 PRODUCTS

2.01 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 1/360 of the span.
- B. Design joists, bridging, and connections for uplift forces indicated on Structural Drawings.

2.02 MATERIALS

- A. Open Web Joists: SJI Type K Joists:
 - 1. 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.
 - 2. Provide holes in chord members for connecting and securing other construction to joists.
 - 3. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
 - 4. Camber joists according to SJI's "Specifications."
 - 5. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.
 - 6. Minimum End Bearing on Steel Supports: As shown on the drawings.

- 7. Minimum End Bearing on Concrete or Masonry Supports: As shown on drawings.
- 8. Finish: Shop primed.
- B. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- C. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.03 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
 - 1. Provide uplift bridging in accordance with SJI's "Specifications" to resist uplift forces indicated on the Structural Drawings.
- B. 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 of finished wall surface unless otherwise indicated.
- C. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.04 FINISH

- A. Shop prime joists .
 - 1. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ERECTION

- A. Do not install joists until supporting construction is in place and secured.
- B. Erect joists with correct bearing on supports.
- C. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications", SJI Technical Digest No. 9, 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. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.
- D. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- E. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces. 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.
- F. Bolt joists to supporting steel framework using high-strength structural bolts where bolts are required. Comply with Research Council on Structural Connection's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

- G. 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.
- H. Position and field weld joist chord extensions and wall attachments.
- I. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- J. Do not field cut or alter structural members without approval of joist manufacturer.
- K. After erection, prime welds, damaged shop primer, and surfaces not shop primed , except surfaces specified not to be primed.

3.03 FIELD QUALITY CONTROL

- A. Refer to Section 05 1200 - Structural Steel Framing for field quality control requirements.

END OF SECTION

SECTION 05 3100 STEEL DECKING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Roof deck.
- B. Supplementary framing for openings up to and including 12 inches.

1.03 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 12 inches.

1.04 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; Latest edition.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
- C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
- F. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- G. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; Latest edition.
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- I. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
- J. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems.
- K. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements.
- L. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks.
- M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.05 SUBMITTALS

- A. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, accessories, and anchorage details.
- C. Certificates: Certify that products furnished meet or exceed specified requirements.
- D. Submit manufacturer's installation instructions.

- E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
 - 1. Optional mechanical fasteners. Compare shear and tension capacities of mechanical fasteners to indicated welded connections.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.06 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
 - 1. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 10 years of experience.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," and AWS D1.3, "Structural Welding Code - Sheet Steel." All welding shall be performed by certified welders only.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Cut plastic wrap to encourage ventilation.
- C. Store deck on dry wood sleepers; slope for positive drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 PRODUCTS

2.01 STEEL DECK

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 - 1. Calculate to structural working stress design and structural properties specified.
 - 2. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
- B. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Ungalvanized Steel Sheet: ASTM A1008/A1008M, Designation SS, Grade 33, Type 1.
 - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 - 3. Structural Properties:
 - a. Span Design: Triple span or more unless noted otherwise on the structural drawings.
 - 4. Minimum Base Metal Thickness: 20 gage, 0.0359 inch.
 - 5. Nominal Height: As indicated on drawings.
 - 6. Profile: Fluted; SDI WR.
 - 7. Side Joints: Lapped mechanically fastened.
 - 8. End Joints: Lapped 2 inches minimum welded or mechanically fastened at Contractor's option.

2.02 ACCESSORY MATERIALS

- A. Welding Materials: AWS D1.1/D1.1M.
- B. Fasteners: Galvanized hardened steel, self tapping.
- C. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.

1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
2. Material: Steel; ASTM A510/A510M.
 - a. Hardness: Rockwell C 54.5, minimum.
 - b. Tensile Strength: 285 kips per square inch, minimum.
 - c. Shear Strength: 175 kips per square inch, minimum.
 - d. Washers:
 - 1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.
 - 2) Exposed Roof Deck Applications: 0.591 inch diameter, minimum.
 - e. Corrosion Resistance:
 - 1) Steel Bar Joist Framing Applications: ASTM B 633, SC1, Type III zinc electroplate.
 - 2) Exposed Roof Deck Applications: Provide manufacturer's standard stainless steel sealing caps with bonded neoprene washer over each fastener.
- D. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
 1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- G. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.03 FABRICATED DECK ACCESSORIES

- A. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 20 gauge design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- B. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- C. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck are not permitted.
- D. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level. Do not stretch or contract side-lap interlocks.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate decking bundles to prevent overloading of supporting members.
- D. On steel supports provide minimum 1-1/2 inch bearing.
- E. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.

- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. 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, but not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 3/4 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches apart, maximum in the field of the roof and 6 inches apart in roof corners and perimeter, based on roof-area definitions of FMG Loss Prevention Data Sheet 1-28 unless closer weld spacing is indicated otherwise on the structural drawings.
 - 3. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18 inches, and as follows:
 - a. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
 - 4. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches.
- H. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- I. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking. At openings between deck and walls, columns, and openings, provide sheet steel closures, reinforcement, and angle flashings to close openings as required for strength, continuity of decking, and support of other work.
- J. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- K. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- L. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.03 FIELD QUALITY CONTROL

- A. Refer to Section 05 1200 - Structural Steel Framing for field quality control requirements.

END OF SECTION

**SECTION 05 4000
COLD-FORMED METAL FRAMING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Formed steel stud exterior wall framing.

1.03 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry. Veneer masonry supported by wall stud metal framing.
- B. Section 07 2500 - Weather Barriers: Weather barrier over sheathing.
- C. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.04 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.06 SUBMITTALS

- A. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- B. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Indicate stud layout.
 - 2. Describe method for securing studs to tracks and for welded framing connections.
 - 3. Shop drawings signed and sealed by a professional structural engineer.
- D. Design Calculations: Comprehensive engineering analysis signed and sealed by the qualified professional engineer responsible for its preparation, submitted for Owner's records. Include cover letter signed and sealed by responsible engineer indicating building code and design criteria used for analysis and stating that analysis was performed by or under his or her direct supervision.
- E. Welding Certificates: Copies of certificates for welding procedures and personnel.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- G. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
 - 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.
- H. Research/Evaluation Reports: For non-standard cold-formed steel framing, from ICC-ES.
- I. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. AISI Specifications: Comply with AISI's current "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing.

1.08 MOCK-UP

- A. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, door frame, exterior wall finish, and interior wall finish.
- B. Location: As directed.
- C. Mock-up may not remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 PRODUCTS

2.01 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
 - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/360 of span.
 - b. Design non-axial loadbearing framing to accommodate not less than 1 in vertical deflection.
- B. Shop fabricate framing system to the greatest extent possible.
- C. Deliver to project site in largest practical sections.

2.02 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.

1. Gage and Depth: As required to meet specified performance levels.
- B. Framing Connectors: Factory-made, formed steel sheet.
 1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
 2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
 - a. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
 - b. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 10 feet.
 4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.
 5. Wall Stud Bridging Connections: Provide mechanical load-transferring devices that accommodate wind load torsion and weak axis buckling induced by axial compression loads. Provide bridging connections as required.

2.03 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated and Drilled expansion bolts.
 1. 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 5 times the design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 2. 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 10 times the design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- C. Welding: Comply with AWS D1.1/D1.1M.

2.04 WALL SHEATHING

- A. Gypsum Board Wall Sheathing: See Section 09 2116.

2.05 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- C. Water-Resistive Barrier: As specified in Section 07 2500.

2.06 MISCELLANEOUS MATERIALS

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

- B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- C. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.07 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations 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 metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Retain subparagraph above and below if option of using mechanical fasteners is retained.
 - c. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 - 4. Fasten other materials to cold-formed metal framing by welding, bolting, 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 metal framing assembly to a maximum out-of-square tolerance of 1/8-inch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.02 PREPARATION

- A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.
- B. 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.

3.03 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

- B. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. 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.
- C. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 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.
- D. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- E. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- F. Erection Tolerances: Install cold-formed metal 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.

3.04 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Squarely seat studs against webs of top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- D. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- E. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- F. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
 - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- G. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- H. Install horizontal bridging in stud system, spaced the dimension indicated on Shop Drawings apart. Fasten at each stud intersection.
 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle.
 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- I. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.
- J. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- K. Install intermediate studs above and below openings to align with wall stud spacing.
- L. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- M. Attach cross studs to studs for attachment of fixtures anchored to walls.
- N. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- O. Touch-up field welds and damaged galvanized surfaces with primer.

3.05 INSTALLATION OF WALL SHEATHING

- A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
 1. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.
 2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges, and ends.

3.06 FIELD QUALITY CONTROL

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

END OF SECTION

**SECTION 05 5000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Shop fabricated steel items.

1.03 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- B. Section 05 0527 - SECURITY METAL FASTENERS.
- C. Section 05 5100 - Metal Stairs.
- D. Section 05 5133 - Metal Ladders.
- E. Section 05 5213 - Pipe and Tube Railings.
- F. Section 09 9113 - Exterior Painting: Paint finish.
- G. Section 09 9123 - Interior Painting: Paint finish.

1.04 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- E. ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- H. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").
- N. SSPC-SP 2 - Hand Tool Cleaning.

1.05 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- B. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- F. Slotted Channel Fittings: ASTM A1011/A1011M.
- G. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 STAINLESS STEEL

- A. Pipe: ASTM A312/A312M, Grade TP316L.
- B. Sheet, Strip, Plate, and Flat Bar: ASTM A666, Type 316L.
- C. Mechanical Fasteners: Type 304 stainless steel fasteners.
 - 1. Provide tamper resistant fasteners as specified in Section 05 0527 where required.

2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
 - 1. Exposed mechanical fasteners in correctional spaces are specified in Section 05 0527.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- C. Lintels: As detailed; galvanized finish.
- D. Door Frames for Overhead Door Openings and Coiling Counter Door Openings: Angle sections; prime paint finish.
- E. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.
- F. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

2.05 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.06 FABRICATION TOLERANCES

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 INSTALLATION

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

3.04 TOLERANCES

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

END OF SECTION

**SECTION 05 5100
METAL STAIRS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.02

1.03 SECTION INCLUDES

- A. Stairs with concrete treads.
- B. Stairs with grating treads.
- C. Structural steel stair framing and supports.
- D. Handrails and guards.

1.04 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete fill in stair pans; mesh reinforcement for landings.
- B. Section 03 3000 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
- C. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- D. Section 05 5000 - Metal Fabrications.
- E. Section 05 5213 - Pipe and Tube Railings: Metal handrails and balusters other than specified in this section.
- F. Section 09 9123 - Interior Painting: Paint finish.

1.05 REFERENCE STANDARDS

- A. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures.
- B. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- L. NAAMM AMP 510 - Metal Stairs Manual.

- M. NAAMM MBG 531 - Metal Bar Grating Manual.
- N. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual.
- O. SSPC-SP 2 - Hand Tool Cleaning.

1.06 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- B. Design Data: As required by authorities having jurisdiction.
- C. Welders' Certificates.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

1.07 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C. Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
 - 1. Regulatory Requirements: Provide stairs and railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.
 - 2. Handrails: Comply with applicable accessibility requirements of ADA Standards.
 - 3. Structural Design: Provide complete stair and railing assemblies that comply with the applicable local code.
 - 4. Dimensions: As indicated on drawings.
 - 5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 - 6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 - 7. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
 - 1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

2. Commercial: Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair not covered by soffit IS considered exposed to view.
 - a. Welded Joints: Intermittently welded on back side, filled with body putty, and sanded smooth and flush.
 - b. Welds Exposed to View: Ground smooth and flush.
 - c. Mechanical Joints: Butted tight, flush, and hairline.
 - d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
 - e. Exposed Edges and Corners: Eased to small uniform radius.
 - f. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for satin or matte finish.
3. Industrial: All joints made neatly.
 - a. Welded Joints: Welded on back side wherever possible.
 - b. Welds Exposed to Touch: Ground smooth.
 - c. Bolts Exposed to Touch in Travel Area: No nuts or screw threads exposed to touch.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
- C. Treads: Metal pan with field-installed concrete fill.
 1. Concrete Depth: 1-1/2 inches, minimum.
 2. Tread Pan Material: Steel sheet.
 3. Tread Pan Thickness: As required by design; 14 gauge, 0.075 inch minimum.
 4. Concrete Reinforcement: Welded wire mesh.
 5. Concrete Finish: Steel troweled.
- D. Risers: Same material and thickness as tread pans.
 1. Nosing Depth: Not more than 1-1/2 inch overhang.
 2. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- E. Stringers: Rolled steel channels.
 1. Stringer Depth: As indicated on drawings.
 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- F. Landings: Similar construction, using corrugated steel decking, supported and reinforced as required to achieve design load capacity.
- G. Railings: Steel picket railings.
- H. Finish: Shop- or factory-prime painted.
- I. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.03 METAL STAIRS WITH GRATING TREADS

- A. Jointing and Finish Quality Level: Industrial, as defined above.
- B. Risers: Open.
- C. Treads: Steel bar grating.
 1. Grating Type: Welded.
 2. Bearing Bar Depth: 3/4 inch, minimum.
 3. Top Surface: Standard.

4. Nosing: Checkered plate.
 5. Nosing Width: 1-1/4 inch, minimum.
 6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.
- D. Stringers: Rolled steel channels.
1. Stringer Depth: As indicated on drawings.
 2. End Closure: Sheet steel, 14 gauge, 0.075 inch minimum; welded across ends.
- E. Railings: Steel pipe railings.
- F. Finish: Shop- or factory-prime painted.

2.04 HANDRAILS AND GUARDS

- A. Wall-Mounted Rails: Round pipe or tube rails unless otherwise indicated.
1. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
- B. Guards:
1. Top Rails: Round pipe or tube rails unless otherwise indicated.
 - a. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
 2. Infill at Picket Railings: Vertical pickets.
 - a. Horizontal Spacing: Maximum 4 inches on center.
 - b. Material: Solid steel bar.
 - c. Shape: Square.
 - d. Size: 1/2 inch square.
 - e. Top Mounting: Welded to underside of top rail.
 - f. Bottom Mounting: Welded to top surface of stringer.
 3. Infill at Pipe Railings: Pipe or tube rails sloped parallel to stair.
 - a. Outside Diameter: 1 inch.
 - b. Material: Steel pipe or tube, round.
 - c. Vertical Spacing: Maximum 4 inches on center.
 - d. Jointing: Welded and ground smooth and flush.
 4. End and Intermediate Posts: Same material and size as top rails.
 - a. Horizontal Spacing: As indicated on drawings.
 - b. Mounting: Welded to top surface of stringer.

2.05 MATERIALS

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
- C. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M Grade B Schedule 40, black finish.
- E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
 2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
- F. Gratings: Bar gratings that comply with NAAMM MBG 531 or NAAMM MBG 532, whichever applies based on bar sizes.
- G. Concrete Fill: See Section 03 3000.
- H. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.06 SHOP FINISHING

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
 - 1. Preparation of Steel: In accordance with SSPC-SP 2 Hand Tool Cleaning.
 - 2. Number of Coats: One.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.
- B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- F. Obtain approval prior to site cutting or creating adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

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

END OF SECTION

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SECTION 05 5133 METAL LADDERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Shop-fabricated metal ladders.
 - 1. Steel elevator pit ladders.
 - 2. Aluminum exterior ladder.

1.03 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Paint finish.

1.04 REFERENCE STANDARDS

- A. 29 CFR 1910.28 - Duty to have Fall Protection and Falling Object Protection.
- B. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
- D. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements.
- E. ANSI/ASSP Z359.16 - Safety Requirements for Climbing Ladder Fall Arrest Systems.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- J. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- M. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.
- N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- O. SSPC-SP 2 - Hand Tool Cleaning.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

- C. Certificate: Provide documentation that ladder safety system products of this section meet or exceed cited 29 CFR 1910.28, 29 CFR 1910.29, ANSI/ASSP Z359.16, and ANSI A14.3 requirements.
- D. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- E. Designer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Design interior and exterior ladders under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

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

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- C. Bolts, Nuts, and Washers: Stainless steel.
- D. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

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

2.04 FABRICATED LADDERS

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

2. Rungs: One inch square tubular rod spaced 12 inches on center.
3. Space rungs 7 inches from wall surface.

2.05 FINISHES - STEEL

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

2.06 FINISHES - ALUMINUM

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

2.07 FABRICATION TOLERANCES

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

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Confirm that the ladder structure to which the ladder safety system is installed is capable of withstanding the loads applied by the system in the event of a fall.

3.02 PREPARATION

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

3.03 INSTALLATION

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

3.04 TOLERANCES

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

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

**SECTION 05 5213
PIPE AND TUBE RAILINGS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Wall mounted handrails.
- B. Balcony railings and guardrails.
- C. Exterior guardrails.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of anchors in masonry.
- C. Section 05 0527 - SECURITY METAL FASTENERS: Security fasteners where required.
- D. Section 05 5100 - Metal Stairs: Handrails other than those specified in this section.
- E. Section 09 9113 - Exterior Painting: Paint finish.
- F. Section 09 9123 - Interior Painting: Paint finish.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- F. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.05 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- B. Designer's Qualification Statement.
- C. Fabricator's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C. Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
 - 1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
 - 2. Intermediate Rails: 1-1/2 inches diameter, round.
 - 3. Posts: 1-1/2 inches diameter, round.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
- G. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
- C. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- D. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- E. Exposed Fasteners: No exposed bolts or screws.
- F. Galvanizing: In accordance with requirements of ASTM A123/A123M.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by continuous welds.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be embedded in masonry with setting templates, for installation as work of other sections.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use security fasteners specified in Section 05 0527

3.04 TOLERANCES

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

END OF SECTION

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**SECTION 05 5305
METAL GRATINGS AND FLOOR PLATES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Formed metal floor gratings.
- B. Perimeter closure.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Framed concrete opening.
- B. Section 05 5000 - Metal Fabrications.

1.04 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
- E. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric).
- F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.05 SUBMITTALS

- A. Product Data: Provide span and deflection tables.
- B. Shop Drawings: Indicate details of component supports, openings, perimeter construction details, and tolerances.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Comply with applicable code for loading requirements.
- B. Maximum Allowable Deflection Under Live Load: 1/240 of span; size components by single support design.
- C. Maximum Spacing Between Bars: To restrict pedestrian shoe heels.

2.02 MATERIALS

- A. Steel Sheet for Lock Forming: Hot-dipped galvanized, ASTM A653/A653M, FS Type B, with G90/Z275 coating.
- B. Steel Framing: ASTM A36/A36M shapes, galvanized per ASTM A123/A123M.
- C. Cross Bars: ASTM B211 ASTM B211M solid bars.
- D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.03 ACCESSORIES

- A. Fasteners and Saddle Clips: Galvanized steel:
- B. Perimeter Closure: Of same material as grating.

2.04 FABRICATION

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

2.05 FINISHES

- A. Galvanizing for Steel Shapes: ASTM A123/A123M.
- B. Galvanizing for Steel Hardware: ASTM A153/A153M.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

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

3.03 TOLERANCES

- A. Maximum Space Between Adjacent Sections: 1/4 inch.
- B. Maximum Variation From Top Surface Plane of Adjacent Sections: 1/16 inch

3.04 SCHEDULES

- A. Trench drains as indicated on the drawings.
- B. Elevator sump pit grating.

**SECTION 06 1000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Communications and electrical room mounting boards.
- G. Concealed wood blocking, nailers, and supports.

1.03 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Air barrier over sheathing.

1.04 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. AWPA U1 - Use Category System: User Specification for Treated Wood.
- D. PS 1 - Structural Plywood.
- E. PS 20 - American Softwood Lumber Standard.

1.05 SUBMITTALS

- A. Product Data: Provide technical data on wood preservative materials and application instructions.

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

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

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

- A. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
 - 1. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as indicated .
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber in contact with roofing, flashing, or waterproofing.
 - c. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
 - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.

3.06 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.07 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 7400 - Construction Waste Management and Cleaning.

1. Comply with applicable regulations.
 2. Do not burn scrap on project site.
 3. Do not burn scraps that have been pressure treated.
 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Hardware.
- D. Preparation for installing utilities.

1.03 RELATED REQUIREMENTS

- A. Section 06 6116 - SOLID SURFACING FABRICATIONS: Countertops.

1.04 REFERENCE STANDARDS

- A. AWI (QCP) - Quality Certification Program.
- B. BHMA A156.9 - American National Standard for Cabinet Hardware.
- C. NEMA LD 3 - High-Pressure Decorative Laminates.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

- A. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide the information required by AWI/AWMAC/WI (AWS).
- B. Product Data: Provide data for hardware accessories.
- C. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
 - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
 - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
 - 1. Comply with AWI (QCP) woodworking association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
 - 2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
 - 3. Provide designated labels on shop drawings as required by certification program.

4. Provide designated labels on installed products as required by certification program.
5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
6. Replace, repair, or rework all work for which certification is refused.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.09 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom grade.
- C. Cabinets:
 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
 2. Finish - Exposed Interior Surfaces: Decorative laminate.
 3. Finish - Semi-Exposed Surfaces: Decorative laminate
 4. Finish - Concealed Surfaces: Manufacturer's option.
 5. Door and Drawer Front Edge Profiles: Square edge with thin applied band.
 6. Door and Drawer Front Retention Profiles: Fixed panel.
 7. Casework Construction Type: Type A - Frameless.
 8. Interface Style for Cabinet and Door: Style 1 - Overlay; reveal overlay.
 9. Cabinet Design Series: As indicated on drawings.
 10. Adjustable Shelf Loading: 50 lbs. per sq. ft.
 - a. Deflection: L/144.
 11. Cabinet Style: Flush overlay.
 12. Cabinet Doors and Drawer Fronts: As indicated.
 13. Drawer Side Construction: Multiple-dovetailed.
 14. Drawer Construction Technique: Dovetail joints.

2.02 WOOD-BASED COMPONENTS

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

2.03 LAMINATE MATERIALS

- A. Manufacturers:
 1. Formica Corporation: www.formica.com/#sle.
 2. Wilsonart LLC: www.wilsonart.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as indicated.
 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, color as selected, finish as selected.
 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, color as selected, finish as selected.
 3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, color as selected, finish as selected.

4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.04 COUNTERTOPS

- A. Countertops are specified in Section 06 6116.

2.05 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
 1. Color: As selected by Architect from manufacturer's standard range.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

2.06 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Fixed Specialty Shelf Supports:
 1. Material: Steel.
 2. Manufacturer's standard, factory-applied, textured powder coat.
 3. Color: White.
- C. Fixed Standard Shelf, Countertop, and Workstation Brackets:
 1. Material: Steel.
 2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
 3. Color: Selected by Architect from manufacturer's standard range.
 4. Products:
 - a. A&M Hardware, Inc; Standard Brackets: <http://www.aandmhardware.com/#sle>.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Fixed Americans with Disabilities Act (ADA)-Compliant Vanity and Countertop Brackets:
 1. Material: Steel.
 2. Finish: Manufacturer's standard, factory-applied primer.
 3. Products:
 - a. A&M Hardware, Inc ; ADA Vanity Brackets: <http://www.aandmhardware.com/#sle>.
 - b. Rakks/Rangine Corporation; ADA Compliant Rakks EHV Vanity Supports: www.rakks.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- E. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.
- F. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finish.
- G. Drawer Slides:
 1. Type: Standard extension.
 2. Static Load Capacity: Commercial grade.
 3. Mounting: Side mounted.
 4. Stops: Integral type.
 5. Manufacturers:
 - a. Accuride International, Inc; Heavy-Duty Drawer Slides: www.accuride.com/#sle.

- b. Knappe & Vogt Manufacturing Company; Heavy-Duty Drawer Slides: www.knappeandvogt.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- H. Hinges: European style concealed self-closing type, steel with nickel-plated finish.
 - 1. Manufacturers:
 - a. Blum, Inc; Compact Blumotion Hinge Systems: www.blum.com/#sle.
 - b. Grass America Inc; TEC Self-close: www.grassusa.com/#sle.
 - c. Hettich America, LP; Optimat: www.hettich.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.07 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

- A. Test installed work for rigidity and ability to support loads.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

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

END OF SECTION

**SECTION 06 6116
SOLID SURFACING FABRICATIONS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Window stools.
- B. Lavatory tops with undermount bowls.
- C. Counter tops with sinks and backsplashes.

1.03 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework: Wood casework and counter support brackets.
- B. Section 07 9200 - Joint Sealants.
- C. Section 22 4000 - Plumbing Fixtures.

1.04 REFERENCE STANDARDS

- A. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use 2016.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- C. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight; 2016
- D. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2014.
- E. ASTM D785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials 2008 (Reapproved 2015).
- F. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2016.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- H. ASTM E228 - Standard Test Method for Linear Thermal Expansion of Solid Materials With a Push-Rod Dilatometer; 2017
- I. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.
- J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- K. IAPMO Z124 - Plastic Plumbing Fixtures 2017.
- L. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- M. NFPA 101 - Life Safety Code.
- N. NFPA 285 - Standard Method of Test of Surface Burning Characteristics of Building Materials 2006.
- O. NSF 51 - Food Equipment Materials 2019.
- P. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).

- Q. UL 2824 - GREENGUARD Certification Program Method for Measuring Microbial Resistance From Various Sources Using Static Environmental Chambers Current Edition, Including All Revisions.
- R. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. Product Data: Indicate Product description including solid surface sheets, sinks, bowls and illustrating full range of standard colors, fabrication information and compliance with specified performance requirements. Submit Product data with resistance to list of chemicals.
- B. Shop Drawings; Indicate plans, sections, dimensions, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in solid surface.
- C. Samples: Submit two samples representative of window stool, 6 x 6 inch in size, illustrating color, texture, and finish.
- D. Maintenance Data: Indicate list of approved cleaning materials and procedures required; list of substances that are harmful to the component materials.

1.06 QUALITY ASSURANCE

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

1.07 WARRANTY

- A. See 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design;
 - 1. Corian® by DuPont; www.corian.com
- B. Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:
 - 1. Samsung Chemical USA; www.staron.com
 - 2. Wilsonart Contract; www.wilsonartcontract.com
 - 3. Avonite; <https://aristechs-surfaces.com/avonite>
- C. Substitutions: 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Performance Design Criteria;

Item #	Property	Requirement	Test Procedure
1	Tensile Strength	6000 psi min.	ASTM D638
2	Tensile Modulus	1.5 x 10 ⁶ psi min	ASTM D638
3	Tensile Elongation	0.4% min.	ASTM D638
4	Flexural Strength	10000 psi min.	ASTM D790

5	Flexural Modulus	1.2 x 10 ⁶ psi min.	ASTM D790
6	Hardness	>85-Rockwell "M" scale min.	ASTM D785
7	Thermal Expansion	2.2 x 10 ⁻⁵ in./in./°F	ASTM E228
8	Fungi and Bacteria	Does not support microbial growth	ASTM G21
9	Microbial Resistance	Highly resistant to mold growth	UL 2824
10	Ball Impact	No fracture - 1/2 lb. Ball: 6mm slab - 36" drop 12mm slab - 144" drop	NEMA LD 3 Method 3.8
11	Weatherability	?E*94<5 in 1,000 hrs	ASTM G155
12	Flammability	Class 1 & A	ASTM E84, NFPA 285, & UL 723
13	Flame Spread	<25	
14	Smoke Developed	<25	
15	Class	A	NFPA 101, Life Safety Code

B. Solid Surface Material:

1. Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:
2. Flammability: Class 1 and A when tested to UL 723.
3. Adhesive for Bonding to Other Products: One component silicone to ASTM C920.
4. Sealant: A standard mildew-resistant, FDA/UL® recognized silicone color matched sealant or clear silicone sealants.
5. Sink/Bowl Mounting Hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.
6. Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
7. Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.03 COMPONENTS

- A. Window Stools: 1/2" thick solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings. Color as indicated on the drawings.
- B. Countertops with Counter Perimeter Frame: Ensure 3/4" thick, moisture resistant;
 1. Cores for counter tops in wet areas having sinks or lavatories are 3/4" thick exterior grade plywood with waterproof adhesive, Fir or Poplar plywood, veneer core only.
 2. MDF core conforming to ANSI A208.2 balanced design, manufactured from recycled materials, meeting ANSI Standards for emissions, of minimum density of 48 lb/cu ft and surface character to match sample approved by Architect. Ensure fire retardant Product contains fire-retardant chemicals injected with raw materials during manufacturing and achieves a maximum flame-spread rating of 25 with a maximum smoke development of 200 when tested to ASTM E84.
- C. Lavatory Tops with Undermount Bowls:
 1. 1 1/4" thick countertop constructed of 1/2" thick solid surfacing material over 3/4" exterior grade plywood with waterproof adhesive, Fir or Poplar plywood, veneer core only.
 2. Provide countertops complete with backsplashes of size shown on Drawings.
 3. Use undermount hardware according to sink manufacturer's instructions.

4. Ensure vanity top and backsplash is single color. Color as indicated on the drawings.
5. Edge details as indicated on Drawings.

2.04 FABRICATION

- A. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
- B. Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.
- C. Ensure no blistering, whitening and cracking of components during forming.
- D. Fabricate backsplashes from solid surfacing material with optional radius cove where counter and backsplashes meet as indicated on Drawings. Backsplashes for most colors may be fabricated by traditional means discussed in K-25294 Backsplashes. Colors with metallic/mica particle or veined colors creating directional aesthetics (K-26833 Directional Aesthetics) may require the techniques in Technical Bulletin K-28235 Thermoformed Backsplash.
- E. Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2") wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using DuPont™ Joint Adhesive 2.0.
- F. Provide holes and cutouts for plumbing and bath accessories as indicated on Drawings.
- G. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
- H. Fabrication Tolerances:
 1. Variation in Component Size: $\pm 1/8"$.
 2. Location of Openings: $\pm 1/8"$ from indicated location.

2.05 FINISH

- A. Color aa selected by Architect from manufacturer's standard color range.
- B. Finish: Ensure surfaces have uniform finish:
 1. Matte, with a 60° gloss rating of 5 - 20.
 2. Semi-gloss, with a 60° gloss rating of 25 - 50.
 3. Polished, with a 60° gloss rating of 55 - 80.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
 2. Verify actual site dimensions and location of adjacent materials prior to commencing work.
 3. Examine cabinets upon which counter tops are to be installed. Verify cabinets are level to within 1/8" in 10' - 0".
 4. Notify Architect in writing of any conditions which would be detrimental to installation.
 5. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

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

3.02 PREPARATION

- A. Provide anchoring devices for installation .
- B. Provide templates and rough-in measurements.

3.03 INSTALLATION

- A. Install components in accordance with shop drawings and manufacturer's instructions.
- B. Rigidly anchor to substrate to prevent misalignment.
- C. Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- D. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- E. Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.
- F. Install countertops with no more than 1/8" sag, bow or other variation from a straight line.
- G. Adhere undermount/submount/bevel mount sinks/bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
- H. Adhere topmount sinks/bowls to countertops using manufacturer recommended adhesives and color-coordinated silicone sealant. Secure seam mount bowls and sinks to counter tops using color matched joint adhesive.
- I. Seal between wall and components with joint sealant as specified herein and in Section 07 9200 as applicable.
- J. Provide backsplashes and endsplashes as indicated on Drawings. Adhere to countertops using a standard color-coordinated silicone sealant. Adhere applied sidesplashes to countertops using a standard color-matched silicone sealant. Provide coved backsplashes and sidesplashes at walls and adjacent millwork. Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed Shop Drawings. Adhere to countertops using manufacturer's standard color-coordinated joint adhesive.
- K. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.
- L. Coordinate connections of plumbing fixtures with Section 22 4000.

3.04 QUALITY CONTROL

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".
- B. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.05 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

3.06 PROTECTION

- A. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- B. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION

**SECTION 07 0553
FIRE AND SMOKE ASSEMBLY IDENTIFICATION**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.03 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Paint finish.

1.04 REFERENCE STANDARDS

- A. ICC (IBC) - International Building Code.

1.05 SUBMITTALS

- A. Schedule: Completely define scope of proposed marking, and indicate location of affected walls and partitions, and number of markings.
- B. Samples: Submit two samples, of size similar to that required for project, illustrating font, wording, and method of application.

1.06 FIELD CONDITIONS

- A. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

2.01 FIRE AND SMOKE ASSEMBLY IDENTIFICATION

- A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).
- B. Applied Fire and Smoke Assembly Identification: Identification markings applied to partition with paint and a code compliant stencil. See Section 09 9123 for products.
- C. Languages: Provide sign markings in English and Spanish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 PREPARATION

- A. See Section 09 9123 for substrate preparation for painted markings.

3.03 INSTALLATION

- A. Locate markings as required by ICC (IBC).
- B. Install applied markings in accordance with Section 09 9123.
- C. Install neatly, with horizontal edges level.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

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**SECTION 07 1113
BITUMINOUS DAMPPROOFING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Bituminous dampproofing.
- B. Protection boards.

1.03 RELATED REQUIREMENTS

- A. Section 31 2323 - Fill.

1.04 REFERENCE STANDARDS

- A. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free.

1.05 SUBMITTALS

- A. Product Data: Provide properties of primer, bitumen, and mastics.
- B. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

1.07 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 BITUMINOUS DAMPPROOFING

- A. Bituminous Dampproofing: Cold-applied, spray-grade; asphalt base, volatile petroleum solvents, and other content, suitable for application by spray, brush, roller, or squeegee; asbestos-free; suitable for application on vertical and horizontal surfaces.
 - 1. Composition: ASTM D4479/D4479M Type I, minimum, asbestos free.
 - 2. VOC Content: Not more than permitted by local, State, and federal regulations.
 - 3. Applied Thickness: 1/16 inch, minimum, wet film.
 - 4. Products:
 - a. W. R. Meadows, Inc; Sealmastic Spray-Mastic: www.wrmeadows.com/#sle.
 - b. Karnak Corporation; 83 Fibered Dampproofing: www.karnak.com.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

2.02 ACCESSORIES

- A. Protection Board: 1/8 inch thick biodegradable hardboard.

PART 3 EXECUTION

3.01 EXAMINATION

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

- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycombs in substrate.

3.03 APPLICATION

- A. Foundation Walls: Apply two coats of asphalt dampproofing.
- B. Perform this work in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- C. Prime surfaces at a rate approved by manufacturer for application indicated, and allow primer to dry thoroughly.
- D. Apply bitumen by spray application.
- E. Apply bitumen at a temperature limited by equiviscous temperature (EVT) plus or minus 25 degrees F; do not exceed finish blowing temperature for four hours.
- F. Apply from 2 inches below finish grade elevation down to top of footings.
- G. Seal items watertight with mastic, that project through dampproofing surface.
- H. Place protection board directly over dampproofing, butt joints, and adhere to tacky dampproofing.
- I. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

**SECTION 07 1300
SHEET WATERPROOFING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Sheet Waterproofing:
 - 1. Self-adhered modified bituminous sheet membrane.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.
- B. Section 22 1006 - Plumbing Piping Specialties: Roof drain and plumbing vent flashing flanges.

1.04 ABBREVIATIONS

- A. NRCA - National Roofing Contractors Association.

1.05 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.
- B. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
- C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- E. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
- F. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- G. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems.
- H. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- J. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- K. NRCA (WM) - The NRCA Waterproofing Manual.

1.06 SUBMITTALS

- A. Product Data: Provide data for membrane, surface conditioner, joint cover sheet, and joint and crack sealants.
- B. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

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

1.08 FIELD CONDITIONS

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

1.09 WARRANTY

- A. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

PART 2 PRODUCTS

2.01 WATERPROOFING APPLICATIONS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
 - 1. Location: Where indicated on the drawings.
 - 2. Cover with drainage panel.

2.02 MEMBRANE MATERIALS

- A. Self-Adhered Modified Bituminous Sheet Membrane:
 - 1. Thickness: 60 mil, 0.060 inch, minimum.
 - 2. Sheet Width: 36 inches, minimum.
 - 3. Tensile Strength:
 - a. Film: 5,000 psi, minimum, measured in accordance with ASTM D882 and at grip-separation rate of 2 inches per minute.
 - b. Membrane: 325 psi, minimum, measured in accordance with ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
 - 4. Elongation at Break: 300 percent, minimum, measured in accordance with ASTM D412.
 - 5. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.
 - 6. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
 - 7. Peel Strength: 7 lb per inch, minimum, when tested in accordance with ASTM D903.
 - 8. Lap Adhesion Strength: 5 lb per inch, minimum, when tested in accordance with ASTM D1876.
 - 9. Puncture Resistance: 50 lb, minimum, measured in accordance with ASTM E154/E154M.
 - 10. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
 - 11. Hydrostatic Resistance: Resists the weight of 200 ft when tested in accordance with ASTM D5385/D5385M.
 - 12. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
 - 13. Manufacturers:
 - a. Carlisle Coatings & Waterproofing Inc; MiraDRI 860/861: www.carlisleccw.com/#sle.
 - b. Henry Company; Blueskin WP 200: www.henry.com/#sle.
 - c. W.R. Meadows, Inc; MEL-ROL: www.wrmeadows.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Seaming Materials: As recommended by membrane manufacturer.
- B. Membrane Sealant: As recommended by membrane manufacturer..
- C. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- D. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.
 - 1. Composition: Dimpled polystyrene, polyethylene, or polypropylene core; polypropylene filter fabric.
 - 2. Manufacturers:
 - a. Carlisle Coatings & Waterproofing Inc; CCW Miradrain Drainage Composite: www.carlisleccw.com.
 - b. Mar-flex Waterproofing & Building Products; ArmorDrain 110: www.mar-flex.com/#sle.
 - c. W.R. Meadows, Inc; Mel-Drain 5012: www.wrmeadows.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- E. Cant Strips: Premolded composition material.
- F. Flexible Flashings: Type recommended by membrane manufacturer.
- G. Termination Bars: Aluminum; compatible with membrane and adhesives.
- H. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- B. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.
- E. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F. Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.
- G. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
 - 1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
 - 2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.
 - 3. Remove and replace areas of defective concrete as specified in Section 03 3000.
 - 4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.

5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

3.03 INSTALLATION - MEMBRANE

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.
- D. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- G. Coordinate with drain installation; see Section 22 1006.
- H. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- I. Extend membrane over cants and up intersecting surfaces at membrane perimeter minimum 6 inches above horizontal surface for first ply and 12 inches at subsequent plies laid in shingle fashion.
- J. Seal membrane and flashings to adjoining surfaces.
 1. Install termination bar along edges.

3.04 INSTALLATION - DRAINAGE PANEL

- A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.
- B. Place protection board directly against drainage panel; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.

3.05 FIELD QUALITY CONTROL

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

3.06 PROTECTION

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

END OF SECTION

SECTION 07 2100 THERMAL INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.02 .

1.03 SECTION INCLUDES

- A. Board insulation at cavity wall construction, perimeter foundation wall, underside of floor slabs, exterior wall behind metal panel wall finish, and exterior fascia behind metal composite material wall panels.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.04 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Board insulation as wall sheathing.
- B. Section 05 4000 - Cold-Formed Metal Framing: Metal framing for support of composite insulation.
- C. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.
- D. Section 07 5300 - Elastomeric Membrane Roofing: Insulation specified as part of roofing system.
- E. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.05 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- E. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
- F. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.06 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.07 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

C. Insulation Inside Masonry Cavity Walls: Polyisocyanurate board.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
 5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 6. Board Edges: Square.
 7. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
 8. Products:
 - a. Dow Chemical Company; STYROFOAM HIGHLOAD 40: www.dowbuildingsolutions.com/#sle.
 - b. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi: www.kingspan.com/#sle.
 - c. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:
 - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
 - 1) Class 1 - Non-reinforced core foam.
 - 2) Compressive Strength: 16 psi, minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; 9.0 at 75 degrees F.
 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 4. Water Vapor Permeance: 1.2 perm, maximum, at 1 inch thickness, and when tested in accordance with ASTM E96/E96M, desiccant method.
 5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 6. Board Size: 48 inch by 96 inch.
 7. Board Thickness: 2.5 inch.
 8. Board Edges: Square.
 9. Products:
 - a. Hunter Panels; Xci Foil (Class A): www.hunterpanels.com/#sle.
 - b. Johns Manville; AP Foil-Faced: www.jm.com/#sle.
 - c. Rmax Inc; ECOMAXci: www.rmax.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Composite Polyisocyanurate (ISO) Board Insulation Faced with Oriented Strand Board (OSB) or Plywood: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:
 - a. Type V: Faced with oriented strand board (OSB) or plywood on one major surface of core foam and glass fiber reinforced cellulosic felt or uncoated or coated polymer-bonded glass fiber mat facer on other major surface of core foam.
 - 1) Compressive Strength: 16 psi, minimum.

- 2) Thermal Resistance, R-value: At 1-1/2 inch thick; 6.2 at 75 degrees F.
2. Top Layer Material: 7/16 inch (11 mm) oriented strand board (OSB).
3. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
4. Board Size: 48 by 96 inch nominal.
5. Composite Insulation Board Thickness: 3.0 inch.
6. Board Edges: Square.
7. Products:
 - a. Hunter Panels; Xci Ply (Basis of Design): www.hunterpanels.com/#sle.
 - b. Atlas Roofing Corporation; AC Foam Nail Base Roof Insulation Panels: www.atlasroofing.com/#sle.
 - c. Rmax; ECOMAXci® Ply: www.rmax.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BATT INSULATION MATERIALS

- A. Flexible Blanket Insulation: Thin profile insulation that complies with complex shapes, unfaced; flame spread index of 5 (five) and smoke development index of 10 (ten) or less when tested in accordance with ASTM E84.
 1. Color: Gray.
 2. Thickness: 3/8 inch.
 3. Products:
 - a. Dow Chemical Company; DOWSIL HPI-1000 Insulation Blanket: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
 2. Width: Are required for application.
 3. Temperature Resistance: Minus 40 degrees F to 212 degrees F
- B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- C. Insulation Fasteners: Appropriate for purpose intended.
 1. Length as required for thickness of insulation material and penetration of deck substrate.
 2. Products: SIP/SD, 4.0 inch manufactured by Hunter Panels.
- D. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Adhere a 6 inches wide strip of polyethylene sheet over construction and control joints with double beads of adhesive each side of joint.
 1. Tape seal joints.
 2. Extend sheet full height of joint.
- B. Apply adhesive to back of boards:
 1. Three continuous beads per board length.

2. Full bed 1/8 inch thick.
- C. Install boards horizontally on foundation perimeter.
 1. Place boards to maximize adhesive contact.
 2. Install in running bond pattern.
 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches on center with manufacturer recommended mechanical fasteners, and tape joints with manufacturer's minimum 4 inches wide sealant tape; comply with ASTM E2357.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Tape insulation board joints.

3.04 BOARD INSTALLATION AT CAVITY WALLS

- A. Apply adhesive to back of boards:
 1. Three continuous beads per board length.
 2. Full bed 1/8 inch thick.
- B. Install boards to fit snugly between wall ties.
 1. Place membrane surface against adhesive.
 2. Place membrane surface facing out, and tape seal board joints.
- C. Install boards horizontally on walls.
 1. Place boards to maximize adhesive contact.
 2. Install in running bond pattern.
 3. Butt edges and ends tightly to adjacent boards and protrusions.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.05 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.06 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Coordinate work of this section with requirements for vapor retarder specified in Section 07 2500.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 1400 - Quality Control Requirements, for additional requirements.
- B. Coordination of Air Barrier Association of America (ABAA) Tests and Inspections:
 1. Provide testing and inspection required by ABAA Quality Assurance Program (QAP).

2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
3. Cooperate with ABAA testing agency.
4. Allow access to air barrier work areas and staging.
5. Do not cover air barrier work until tested, inspected, and accepted.

3.08 PROTECTION

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

END OF SECTION

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SECTION 07 2500 WEATHER BARRIERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.
- C. Air Barriers: Materials that form a system to stop passage of air through exterior walls and joints between exterior walls and roof.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 04 2000 - Unit Masonry: Mock up requirements.
- C. Section 07 2100 - Thermal Insulation: Water-resistive barrier installed over composite insulation.
- D. Section 07 9200 - Joint Sealants: Sealing building expansion joints.

1.04 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm.}$

1.05 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test.
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
- G. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing.

1.06 SUBMITTALS

- A. Product Data: Provide data on material characteristics.
- B. Shop Drawings: Provide drawings of special joint conditions.

- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- D. Manufacturer's Installation Instructions: Indicate preparation.
- E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.

1.07 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
 - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
 - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.08 MOCK-UP

- A. Install vapor retarder materials in mock-up specified in Section 04 2000.

1.09 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
- B. Air Barrier:
 - 1. On outside surface of sheathing of exterior walls use air barrier sheet, mechanically fastened type.
- C. Exterior Vapor Retarder:
 - 1. On outside surface of inside wythe of masonry cavity wall use vapor retarder coating.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier Sheet, Mechanically Fastened:
 - 1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F.
 - 3. Water Penetration Resistance: Withstand a water head of 21 inches, minimum, for minimum of 5 hours, when tested in accordance with AATCC Test Method 127.
 - 4. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.
 - 5. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
 - 6. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.
 - 7. Manufacturers:

- a. DuPont de Nemours, Inc; Tyvek CommercialWrap D with Tyvek Fluid Applied Flashing - Brush Formulation, Tyvek Fluid Applied Flashing and Joint Compound, FlexWrap NF, StraightFlash, StraightFlash VF, Tyvek Wrap Caps, and Tyvek Tape: building.dupont.com/#sle.
- b. Fortifiber Building Systems Group; WeatherSmart Drainable: www.fortifiber.com/#sle.
- c. Kimberly-Clark, distributed by Wolf Home Products; BLOCK-IT House Wrap: www.wolfhomeproducts.com/#sle.
- d. Kingspan Insulation LLC; GreenGuard RainDrop Building Wrap: www.trustgreenguard.com/#sle.
- e. Substitutions: See Section 01 6000 - Product Requirements.

2.03 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
 - 1. Dry Film Thickness (DFT): 40 mils, 0.040 inch, minimum.
 - 2. Water Vapor Permeance: 1.0 perm, maximum, when tested in accordance with ASTM E96/E96M.
 - 3. VOC Content: Less than 50 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
 - 4. Resistance to Fungal Growth: No growth when tested according to ASTM D5590.
 - 5. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
 - 6. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
 - 7. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
 - 8. Manufacturers:
 - a. Henry Company; Air-Bloc 16MR: www.henry.com/#sle.
 - b. PROSOCO, Inc; R-GUARD VB: www.prosoco.com/r-guard/#sle.
 - c. Sto Corp; Sto VaporSeal (40 mil application): www.stocorp.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 9. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.04 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
 - 1. Composition: Butyl rubber sheet laminated to elasticized polyethylene sheet.
 - 2. Thickness: 30 mil, 0.030 inch, nominal; exception from ASTM D1970/D1970M.
 - 3. Manufacturers:
 - a. DuPont de Nemours, Inc; DuPont StraightFlash: building.dupont.com/#sle.
 - b. DuPont de Nemours, Inc; DuPont VersaFlange: building.dupont.com/#sle.
 - c. Fortifiber Building Systems Group; FortiFlash Butyl: www.fortifiber.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- E. Mechanically Fastened Sheets - On Exterior:
 - 1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
 - 2. Overlap seams as recommended by manufacturer but at least 6 inches.
 - 3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
 - 4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
 - 5. Install air barrier and vapor retarder underneath the jamb flashings.
 - 6. Install head flashings under weather barrier.
 - 7. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.
- F. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 - 3. Use flashing to seal to adjacent construction and to bridge joints.
- G. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 - 3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 - 4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
 - 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Control Requirements, for additional requirements.

- B. Coordination of ABAA Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA QAP.
 - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 - 3. Cooperate with ABAA testing agency.
 - 4. Allow access to air barrier work areas and staging.
 - 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Do not cover installed weather barriers until required inspections have been completed.
- D. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- E. Take digital photographs of each portion of the installation prior to covering up.

3.05 PROTECTION

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

END OF SECTION

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SECTION 07 4213.23
METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A.

1.02 SECTION INCLUDES

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

1.03 RELATED REQUIREMENTS

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

1.04 REFERENCE STANDARDS

- A. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- E. ASTM D523 - Standard Test Method for Specular Gloss.
- F. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives.
- G. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
- H. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
- I. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet.
- J. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- L. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- O. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.05 ADMINISTRATIVE REQUIREMENTS

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

1.06 SUBMITTALS

- A. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
 - 1. Finish manufacturer's data sheet showing physical and performance characteristics.
 - 2. Storage and handling requirements and recommendations.
 - 3. Fabrication instructions and recommendations.
 - 4. Specimen warranty for finish, as specified herein.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components shown on shop drawings.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions and recommendations.
 - 4. Specimen warranty for wall system, as specified herein.
- C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 - 1. Indicate panel numbering system.
 - 2. Differentiate between shop and field fabrication.
 - 3. Indicate substrates and adjacent work with which the wall system must be coordinated.
 - 4. Include large-scale details of anchorages and connecting elements.
 - 5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
 - 6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- D. Selection Samples: For each finish product specified, submit at least three sample color chips representing manufacturer's standard range of available colors and patterns.
 - 1. Sealant Color: Color to match wall panels.
- E. Verification Samples: For each finish product specified, submit at least three samples, minimum size 12 inch square, and representing actual product in color and texture.
- F. Certificate: Certify that the work results of this section meet or exceed specified requirements.
- G. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- H. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.
- I. Test Report: Submit report of full-size mock-up test for NFPA 285 fire performance.

- J. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- K. Designer's Qualification Statement.
- L. Manufacturer's Qualification Statement.
- M. Installer's Qualification Statement.
- N. Testing Agency's Qualification Statement.
- O. Maintenance Data: Care of finishes and warranty requirements.
- P. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.
- B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
 - 1. With not less than three years of documented experience.
 - 2. Approved by MCM sheet manufacturer.
 - 3. Submit contact names and phone numbers for at least three references connected with successful past projects.
- D. Installer Qualifications: Company specializing in performing work of the type specified in this section.
 - 1. With minimum three years of documented experience.
 - 2. Approved by wall panel system manufacturer.
 - 3. Submit contact names and phone numbers for at least three references connected with successful past projects.
- E. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.

1.08 DELIVERY, STORAGE, AND HANDLING

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

5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.09 WARRANTY

- A. Correct defective work within a five year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
- B. MCM Sheet Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 30 years:
 1. Chalking: No more than that represented by a No. 8 rating based on ASTM D4214.
 2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
 3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Composite Material (MCM) Sheet Manufacturers:
 1. Laminators, Inc; Omega-Lite (Basis of Design): www.laminatorsinc.com.
 - a. Types: Rout and Return system.
 2. ATAS International, Inc; SterraCore: www.atas.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WALL PANEL SYSTEM

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.
 1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
 2. Provide panel jointing and weatherseal using a "wet", sealant-sealed system.
 3. Anchor panels to supporting framing without exposed fasteners.

2.03 PERFORMANCE REQUIREMENTS

- A. Provide tests on full-size mock-ups; tests performed previously for other projects are acceptable provided tested assemblies are truly equivalent to those to be used on this project, unless otherwise indicated.
- B. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
 1. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
 2. Inward Design Wind Pressure: As indicated on the structural drawings.
 3. Outward Design Wind Pressure: As indicated on the structural drawings.
 4. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
 5. Maximum anchor deflection in any direction of 1/16 inch at connection points of framing members to anchors.
- C. Air Infiltration: 0.06 cfm/sq ft of wall area, maximum, when tested at 1.57 psf in accordance with ASTM E283.

- D. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.24 psf minimum, after 15 minutes.
 - 1. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
 - 2. Design to drain leakage and condensation to the exterior face of the wall.
- E. Fire Performance: Tested in accordance with, and complying with the acceptance criteria of, NFPA 285; testing performed for previous project is acceptable provided tested system was truly equivalent.

2.04 PANELS

- A. Panels:
 - 1. Rout and Return 1 inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
 - 2. Reinforce corners with riveted aluminum angles.
 - 3. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
 - 4. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
 - 5. Reinforce panels over 24 inches long with metal angle braces 24 inches on center in short direction.
 - 6. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
 - 7. Metallic Finished Panels: Maintain consistent grain of MCM sheet; specifically, do not rotate sheet purely to avoid waste.
 - 8. Fabricate panels under controlled shop conditions.
 - 9. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
 - 10. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
 - a. Make panel lines, breaks, curves, and angles sharp and true.
 - b. Keep plane surfaces free from warp or buckle.
 - c. Keep panel surfaces free of scratches or marks caused during fabrication.
 - 11. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

2.05 MATERIALS

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
 - 1. Overall Sheet Thickness: 0.236 inch, minimum.
 - 2. Face Sheet Thickness: 0.032 inches, minimum.
 - 3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.
 - 4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
 - 5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - 6. Flammability: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929.

7. Factory Finish: Two coat fluoropolymer resin coating, approved by the coating manufacturer for the length of warranty specified for the project, and applied by coil manufacturing facility that specializes in coil applied finishes.
 - a. Basis of Design: PVDF/Kynar 500 fluoropolymer resin coating as manufactured by Arkema.
 - b. Coating Flexibility: Pass ASTM D4145 minimum 1T-bend, at time of manufacturing.
 - c. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.
8. Colors:
 - a. As selected by Architect from manufacturer's Custom range for Rout and Return panels.
- B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
 1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
 2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
 3. Stainless Steel Sheet Components: ASTM A480/A480M.
 4. Aluminum Components: ASTM B209 (ASTM B209M); or ASTM B221 (ASTM B221M).
 5. Refer to Section 05 4000 for additional requirements on panel support framing.

2.06 ACCESSORIES

- A. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet; refer to Section 07 6200 for additional requirements.
- B. Fasteners:
 1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
 2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
 3. Bolts: Stainless steel.
 4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- C. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15-mil dry film thickness per coat.
- D. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.
 1. Refer to Section 07 9200 for additional requirements.
- E. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices, and attachments.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine dimensions, tolerances, and interfaces with other work.
 1. Verify that weather barrier system is properly installed; refer to Section 07 2500 for requirements.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

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

3.03 INSTALLATION

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

3.04 FIELD QUALITY CONTROL

- A. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.
- B. Site Visits: Schedule two site visits during execution of installation.

3.05 CLEANING

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.06 PROTECTION

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

END OF SECTION

**SECTION 07 4213
METAL WALL PANELS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Manufactured metal panels for exterior wall panels and thermally broken rainscreen attachment system, with related flashings and accessory components.

1.03 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.

1.04 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document).
- C. ASTM A1046/A1046M - Standard Specification for Steel Sheet, Zinc-Aluminum-Magnesium Alloy-Coated by the Hot-Dip Process.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.05 SUBMITTALS

- A. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components shown on shop drawings.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions and recommendations.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.
- C. Samples: Submit two samples of wall panel, 12 inches by 12 inches in size illustrating finish color, sheen, and texture.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.
- F. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

- B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.08 WARRANTY

- A. Correct defective work within a two year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
- B. Special Panel Finish Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal wall panels that display evidence of deterioration of finish within 20 years from the date of substantial completion.
- C. Attachment System Warranty: Provide a 10 year warranty that includes:
 - 1. Components of the attachment system, including structural failure of components when all the materials and components are supplied and installed per manufacturer's requirements.
 - 2. Labor and material for removal and replacement of defective material.
 - 3. Labor to remove and reinstall façade finish panels, finish closures and façade finish accessories necessary to access defective material.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design:
 - 1. Metal Wall Panels - Concealed Fasteners: IW Series, IW-10A manufactured by Centria: www.centria.com/#sle.
- B. Other Acceptable Manufacturers - Metal Wall Panels - Concealed Fasteners:
 - 1. ATAS International, Inc; Multi-Purpose Panels MPH - 12 inch: www.atas.com/#sle.
 - 2. Metal Roofing Systems, Inc; Flush Seam Wall Panels: www.metalroofingsystems.biz/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MANUFACTURED METAL PANELS

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
 - 1. Provide exterior wall panels and subgirt framing assembly.
 - 2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
 - 3. Design Pressure: In accordance with applicable codes.
 - 4. Maximum Allowable Deflection of Panel: $L/180$ for length(L) of span.
 - 5. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
 - 6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 - 7. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 - 8. Corners: Factory-fabricated in one continuous piece with minimum 2 inch returns.
- B. Exterior Wall Panels:
 - 1. Profile: Horizontal; style as indicated.
 - 2. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.
 - 3. Material: Precoated steel sheet, 22 gauge, 0.0299 inch minimum thickness.
 - 4. Panel Width: 12 inches.

- 5. Color: As selected by Architect from manufacturer's standard line.
- C. Subgirt Framing Assembly:
 - 1. 16 gauge, 0.0598 inch thick formed non-precoated steel sheet.
 - 2. Profile as indicated; to attach panel system to CMU.
- D. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
 - 1. Provide mitered internal corners, back braced with 22 gauge, 0.0299 inch thick precoated metal sheet to maintain continuity of profile.
- E. Expansion Joints: Same material, thickness and finish as exterior sheets; 22 gauge, 0.-299 inch thick; manufacturer's standard brake formed type, of profile to suit system.
- F. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- G. Anchors: Galvanized steel.

2.03 MATERIALS

- A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Structural Steel (SS) or Forming Steel (FS), with G90/Z275 coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
- B. Select materials with surface flatness, smoothness, and lack of surface blemishes where exposed to view in finished system.

2.04 FINISHES

- A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat aluminum coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss to match sample.

2.05 THERMALLY BROKEN RAINSCREEN ATTACHMENT SYSTEM

- A. Support Framing Attachment System:
 - 1. No framing component may penetrate the layer of continuous exterior insulation other than thermally isolated fasteners.
- B. Thermal Performance:
 - 1. Full constructed assembly must have a minimum 95% EFFECTIVE R-value when compared to the exterior continuous insulations rated R-Value.
 - 2. Continuous framing profiles (including C- or Z-shaped sections or furring) penetrating insulation not allowed.
- C. Materials:
 - 1. Coating Material: ASTM A1046/A1046M, Zinc-Aluminum-Magnesium, minimum thickness ZM40.
 - a. ASTM A653 Galvanized steel is not acceptable.
 - 2. Steel Classification: Structural Steel (SS), Grade 50, 50 ksi Yield.
- D. Vertical Girt: Vertical girt with pre-punched attachment holes, directly attached on top of rigid insulation directly to substrate at regular spacing, with engineered thermally isolated washer assembly and fasteners.
 - 1. Steel Thickness: Minimum 0.046-inch thick (18 gauge).
 - 2. Profile Depth: 0.75 inches.
 - 3. Girt Fastening Face, Width: 2-inches.
 - 4. Basis of Design: CI™ by Knight Wall Systems.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- E. Fasteners:

1. Sufficient length to provide solid attachment through rigid insulation to structure as required by manufacturer.
 2. Thermal Isolating Washers: Minimum 0.125 inch thick Polyoxymethylene copolymer (POM) washers with integral centering lip to act as a thermal break between wall anchor fasteners and girt.
 - a. Tensile Yield Strength: 9.57 ksi per ISO 527
 - b. Melting Temperature: 329 degrees Fahrenheit per ISO 3146
 - c. Basis of Design: ThermaStop™ Isolator by Knight Wall Systems.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - e. Embedment depth: 0.625 inches or three full threads minimum, whichever is greater.
 - f. Minimum ultimate pull-out capacity from 18 gauge steel: 450 pounds.
 3. Concrete and concrete masonry units substrate:
 - a. Embedment depth: 1.25 inches minimum.
 - b. Minimum ultimate pull-out capacity from substrate material: 450 pounds.
 - c. 1/4 inch Kwik-Con II+ by Hilti
 - d. 1/4 inch Tapcon by Buildex
 - e. 1/4 inch UltraCon by Elco Industries
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- F. Accessories:
1. Galvanic Protection: Utilize tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

2.06 ACCESSORIES

- A. Cladding Support Clips: Thermally-broken, galvanized steel clips for support of cladding z-girts, angles, channels and other framing.
 1. Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 galvanized coating.
- B. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
- C. Concealed Sealants: Non-curing butyl sealant or tape sealant.
- D. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
- E. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.
 1. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws.
 2. Manufacturers:
 - a. ITW Commercial Construction North America; Teks Select Series: www.ITWBuildex.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- F. Field Touch-up Paint: As recommended by panel manufacturer.
- G. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.01 PREPARATION

- A. Install subgirts perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane. Space at intervals indicated.
 1. Install vertical girts in vertical orientation in strict accordance with manufacturer's installation instructions.
 2. Do not use shims to plumb the wall between the vertical girt and insulation.

3. Minimum length of installed cut girt is 24-inches and shall be attached with at least two (2) fasteners.

3.02 INSTALLATION

- A. Install panels on walls in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten panels to structural supports; aligned, level, and plumb.
- D. Locate joints over supports.
- E. Lap panel ends minimum 2 inches.
- F. Provide expansion joints where indicated.
- G. Use concealed fasteners unless otherwise approved by Architect.
- H. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.03 TOLERANCES

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

3.04 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.
- C. See Section 01 7400 - Construction Waste Management and Cleaning, for additional requirements.
- D. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610.

END OF SECTION

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**SECTION 07 5300
ELASTOMERIC MEMBRANE ROOFING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Elastomeric roofing membrane, mechanically fastened conventional and adhered conventional application.
- B. Insulation, flat and tapered.
- C. Cover boards.
- D. Flashings.
- E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.03 RELATED REQUIREMENTS

- A. Section 05 3100 - Steel Decking: Product requirements for acoustical insulation for deck flutes, for placement by this section.
- B. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets.
- D. Section 22 1006 - Plumbing Piping Specialties: Roof drains.
- E. Section 26 4113 - Lightning Protection for Structures.

1.04 REFERENCE STANDARDS

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- C. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.
- D. FM (AG) - FM Approval Guide.
- E. FM DS 1-28 - Wind Design.
- F. NRCA (WM) - The NRCA Waterproofing Manual.
- G. UL (DIR) - Online Certifications Directory.

1.05 SUBMITTALS

- A. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and fasteners.
- B. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and walkway pad layout.
- C. Samples for Verification: Submit two samples 6 by 6 inches in size illustrating insulation.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

- F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience, and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 115 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.09 WARRANTY

- A. Correct defective work within a two year period after Date of Substantial Completion.
- B. Provide twenty year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: www.carlisle-syntec.com/#sle.
 - 2. Firestone Building Products, LLC: www.firestonebpco.com/#sle.
 - 3. GenFlex Roofing Systems, LLC: www.genflex.com/#sle.
 - 4. Johns Manville; JM EPDM: www.jm.com/#sle.
 - 5. Versico Roofing Systems; VersiGard EPDM: www.versico.com/#sle.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation:
 - 1. Dow Chemical Company; []: www.dow.com/#sle.

2. Hunter Panels; []: www.hunterpanels.com/#sle.
3. Versico Roofing Systems; SecurShield Insulation: www.versico.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over insulation.
- B. Roofing Assembly Requirements:
 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
 3. Insulation Thermal Resistance (R-Value): 6.5 per inch, minimum; provide insulation of thickness required.
- C. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.
 1. Minimum 2 layers of polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-monomer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637/D4637M.
 1. Thickness: 0.060 inch (60 mil).
 2. Sheet Width: 76 inch, minimum; factory-fabricate into largest sheets possible.
 3. Thermal Emittance: 0.84, minimum, initial, and 0.87, minimum, 3-year, certified by Cool Roof Rating Council.
 4. Color: Black.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Fasteners: As recommended by and approved by membrane manufacturer.
- D. Flexible Flashing Material: Same material as membrane.
 1. Color: Black.
- E. Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55- to 60-mil-thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

2.04 COVER BOARDS

- A. Cover Boards: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.
 1. Thickness: 1/2 inch, fire-resistant.
 2. Manufacturers:
 - a. Georgia-Pacific; DensDeck: www.densdeck.com/#sle.
 - b. United States Gypsum: www.usg.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.05 INSULATION

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
 1. Classifications:
 - a. Type II:
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
 2. Board Size: 48 by 96 inch.
 3. Board Thickness: 2.0 inch.

4. Tapered Board: Slope as indicated; minimum thickness 1/4 inch; fabricate of fewest layers possible.
5. Board Edges: Square.

2.06 ACCESSORIES

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials ; cants formed to 45 degree angle, tapered edge strips, and other configurations as detailed.
- C. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self-adhering.
- D. Insulation Fasteners: Appropriate for purpose intended and approved by Factory Mutual and roofing manufacturer.
 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- E. Membrane Adhesive: As recommended by membrane manufacturer.
- F. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- G. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- H. Insulation Adhesive: As recommended by insulation manufacturer.
- I. Sealants: As recommended by membrane manufacturer.
- J. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 1. Composition: Roofing membrane manufacturer's standard.
 2. Size: 18 by 18 inches.
 3. Surface Color: White or yellow.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 INSTALLATION - INSULATION, UNDER MEMBRANE

- A. Attachment of Insulation:
 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
 2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
- B. Cover Boards: Adhesive Installation over Thermal Insulation, under Single-Ply Roofing Systems:
 1. Stagger roof board end and edge joints minimum 12 inch over installed insulation layers.
 2. Stagger roof board end and edge joints minimum 6 inches.

3. Adhere roof boards over installed insulation using adhesive as recommended by roofing system manufacturer's product data.
 4. Apply overall pressure to ensure full adhesion. Do not slide into place.
- C. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
 - D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
 - E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
 - F. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
 - G. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
 - H. Do not apply more insulation than can be covered with membrane in same day.

3.03 INSTALLATION - MEMBRANE

- A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Fully Adhered Application: Apply adhesive to substrate at rate of 0.833 gal/square. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- E. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- F. At intersections with vertical surfaces:
 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 2. Fully adhere flexible flashing over membrane and up to nailing strips.
 3. Secure flashing to nailing strips at 4 inches on center.
 4. Insert flashing into reglets and secure.
- G. Around roof penetrations, seal flanges and flashings with flexible flashing.
- H. Coordinate installation of roof drains and sumps and related flashings.

3.04 INSTALLATION - MEMBRANE FINISH COATING/COVER

- A. Install walkway pads. Space pad joints to permit drainage.
- B. Adhere protection sheet over membrane roofing at locations indicated.

3.05 FIELD QUALITY CONTROL

- A. Owner will provide testing services in accordance with Section 01 4000 - Quality Control Requirements, Contractor to provide temporary construction and materials for testing.
- B. Require site attendance of roofing and insulation material manufacturers daily during installation of the work.

3.06 CLEANING

- A. See Section 01 7400 - Construction Waste Management and Cleaning, for additional requirements.
- B. Remove bituminous markings from finished surfaces.

- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

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

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and exterior penetrations.
- B. Sealants for joints within sheet metal fabrications.

1.03 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Metal flashings embedded in masonry.
- B. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.
- C. Section 07 7100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.
- D. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.04 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- C. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- D. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- F. CDA A4050 - Copper in Architecture - Handbook.
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual.

1.05 SUBMITTALS

- A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, (0.0156 inch) thick; smooth No. 4 - Brushed finish.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches over roofing membrane. Return and brake edges.

2.03 EXTERIOR PENETRATION FLASHING PANELS

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

2.04 ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I (No. 15).
- C. Primer: Zinc chromate type.
- D. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.
- E. Concealed Sealants: Non-curing butyl sealant.
- F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- G. Plastic Cement: ASTM D4586/D4586M, Type I.
- H. Reglets: Recessed type, stainless steel - 22 gauge.
 - 1. Product: 2-Piece Counter Flashing manufactured by ATAS International, Inc.
 - 2. Product: Masonry Reglet "MA" with Springlok Counter Flashing manufactured by Fry Reglet.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

- A. Insert flashings into reglets to form tight fit; secure in place with plastic wedges; seal flashings into reglets with sealant.
- B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

END OF SECTION

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SECTION 07 7100 ROOF SPECIALTIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Manufactured roof specialties, including fascias.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).
- B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems.
- C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- D. NRCA (RM) - The NRCA Roofing Manual.

1.04 SUBMITTALS

- A. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- C. Samples: Submit two appropriately sized samples of fascia.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roof Edge Flashings and Copings:
 - 1. ATAS International, Inc; Rapid-Lok Fascia: www.atas.com/#sle.
 - 2. Metal-Era Inc; Anchor-Tite Fascia: www.metalera.com/#sle.
 - 3. OMG Roofing Products; TerminEdge Fascia: www.omgroofing.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
 - 1. Configuration: Fascia, cant, and edge securement for roof membrane.
 - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
 - 3. Exposed Face Height: As indicated on drawings.
 - 4. Material: Formed aluminum sheet, 0.050 inch thick, minimum.
 - 5. Finish: 70 percent polyvinylidene fluoride.
 - 6. Color: To be selected by Architect from manufacturer's standard range.

2.03 FINISHES

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

2.04 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Roof Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

END OF SECTION

**SECTION 07 8100
APPLIED FIRE PROTECTION**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Applied fire protection of interior structural steel not exposed to damage or moisture.
- B. Applied fire protection of structural steel exposed to damage or moisture.

1.03 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing.
- B. Section 05 2100 - Steel Joist Framing.
- C. Section 05 3100 - Steel Decking.
- D. Section 07 0553 - Fire and Smoke Assembly Identification.
- E. Section 07 8123 - Intumescent Fire Protection.
- F. Section 07 8400 - Firestopping.

1.04 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- C. ASTM E759/E759M - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members.
- D. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members.
- E. ASTM E859/E859M - Standard Test Method for Air Erosion of Sprayed Fire-Resistive Material (SFRMs) Applied to Structural Members.
- F. ASTM E937/E937M - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.
- G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.
- B. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

- A. Product Data: Provide data indicating product characteristics.
- B. Manufacturer's Certificate: Certify that applied fireproofing products meet or exceed requirements of Contract Documents.
- C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:
 - 1. Bond strength.

2. Bond impact.
 3. Compressive strength.
 4. Fire tests using substrate materials similar those on project.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
 - E. Field Quality Control Submittals: Submit field test report.
 - F. Manufacturer Reports: Indicate environmental conditions that applied fireproofing materials were installed.
 - G. Manufacturer's Qualification Statement.
 - H. Installer's Qualification Statement.

1.07 QUALITY ASSURANCE

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

1.08 MOCK-UP

- A. Construct mock-up, 100 square feet in size.
- B. Comply with project requirements for fire ratings.
- C. Locate where directed.
- D. Examine installation within one hour of application to determine variances from specified requirements due to shrinkage, temperature, and humidity.
- E. Where shrinkage and cracking are evident, adjust mixture and method of application as necessary; remove materials and re-construct mock-up.
- F. Mock-up may remain as part of the Work.

1.09 FIELD CONDITIONS

- A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

1.10 WARRANTY

- A. Correct defective Work within a two year period after Date of Substantial Completion.
 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
 2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Applied Fire Protection:
 1. GCP Applied Technologies: www.gcpat.com/#sle.
 2. Isolatek International Corp: www.isolatek.com/#sle.
 3. Southwest Fireproofing Products Company: www.sfrm.com/#sle.
 4. Carboline Company: www.carboline.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 APPLIED FIRE PROTECTION ASSEMBLIES

- A. Provide assemblies as indicated on drawings.
- B. UL listings with a Load Restriction are not allowed.

2.03 MATERIALS

- A. Applied Fire Protection Material for Interior Applications, Concealed: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire resistance, and complying with following requirements:
 - 1. Composition: Portland cement-based; not mineral fiber-based.
 - 2. Bond Strength: 1000 pounds per square foot, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
 - 3. Dry Density: As required by fire resistance design.
 - 4. Compressive Strength: 50 pounds per square inch, minimum.
 - 5. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
 - 6. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
 - 7. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
 - 8. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
 - 9. Effect of Deflection: No cracking, spalling, or delamination, when tested in accordance with ASTM E759/E759M.
 - 10. Fungal Resistance: No growth after 28 days when tested according to ASTM G21.
 - 11. Manufacturers:
 - a. As required by the fire proofing designs indicated on the drawings.
- B. Applied Fire Protection Material Exposed to Damage or Moisture: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire resistance, and complying with following requirements:
 - 1. Recommended by manufacturer for permanent exterior exposure.
 - 2. Composition: Portland cement-based; not mineral fiber-based.
 - 3. Bond Strength: 1,000 psf, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
 - 4. Dry Density: As required by fire resistance design.
 - 5. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
 - 6. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
 - 7. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
 - 8. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
 - 9. Fungal Resistance: No growth after 28 days when tested according to ASTM G21.
 - 10. Manufacturers:
 - a. As required by the fire proofing designs indicated on the drawings.

2.04 ACCESSORIES

- A. Primer Adhesive: Of type recommended by applied fire protection manufacturer.
- B. Metal Lath: Expanded metal lath; minimum weight of 1.7 psf, galvanized finish.
- C. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled.
- E. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Apply fireproofing manufacturer's recommended bonding agent on primed steel.
- E. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- F. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

- A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.
- B. Apply primer adhesive in accordance with manufacturer's instructions.
- C. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.
- D. In exposed locations, trowel surface smooth and form square edges, using tools and procedures recommended by fireproofing manufacturer.

3.04 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 4000 - Quality Control Requirements and Section 01 4533 - Code-Required Special Inspections and Procedures.
- B. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
 - 1. Submit field test reports promptly to Contractor and Architect.
- C. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
- D. Repair or replace applied fireproofing at locations where test results indicate fireproofing does not meet specified requirements.
- E. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.

- C. At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.

END OF SECTION

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**SECTION 07 8123
INTUMESCENT FIRE PROTECTION**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Thin-film intumescent fire protection.
- B. Protective and/or decorative topcoats.

1.03 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing.
- B. Section 07 0553 - Fire and Smoke Assembly Identification.
- C. Section 07 8100 - Applied Fire Protection: Conventional cementitious and mineral fiber fireproofing.
- D. Section 09 9123 - Interior Painting: Field-applied paints matching intumescent fireproofing.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. SSPC-PA 2 - Procedure For Determining Conformance To Dry Coating Thickness Requirements.

1.05 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Performance characteristics and test results.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- B. Selection Samples: For decorative top coat, color chips representing manufacturer's full range of available colors and sheens.
- C. Certificates: Certify that intumescent fireproofing provided for this project meets or exceeds specified requirements in all respects.
- D. Test Reports: Published fire resistive designs for structural elements of the types required for the project, indicating hourly ratings of each assembly.
- E. Field Quality Control Submittals: Submit field test report.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company that specializes in manufacturing the type of products specified, with minimum of ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.07 MOCK-UP

- A. Provide a mock-up for evaluation of surface preparation techniques and application workmanship; approved mock-up will serve as a standard of comparison for subsequent work of this section.
- B. Finish at least 100 sq ft of surface in areas as designated by Architect.
- C. Evaluate mock-up for compliance with specified requirements, including thickness and finish texture.
- D. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
- E. Refinish mock-up area as required to produce acceptable work.
- F. Approved mock-up may remain as part of the project.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers with identification labels and testing agency markings intact and legible.
- B. Store products in manufacturer's unopened packaging until ready for installation.
 - 1. Store at temperatures not less than 50 degrees F in dry, protected area.
 - 2. Protect from freezing, and do not store in direct sunlight.
 - 3. Dispose of any materials that have come into contact with contaminants of any kind prior to application.
- C. Dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.09 FIELD CONDITIONS

- A. Protect areas of application from windblown dust and rain.
- B. Maintain ambient field conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.
 - 1. Provide temporary enclosures as required to control ambient conditions.
 - 2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F without specific approval from manufacturer.
 - 3. Maintain relative humidity between 40 and 60 percent in areas of application.
 - 4. Maintain ventilation in enclosed spaces during application and for not less than 72 hours afterward.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Intumescent Thin-Film Fire Protection:
 - 1. Hilti, Inc; Fire Finish Steel Protection Spray CFP-SP WB: www.us.hilti.com/#sle.
 - 2. Isolatek International Corp; Spray Film WB 5: www.isolatek.com/#sle.
 - 3. Carboline; THERMO-SORB: www.carboline.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SYSTEM REQUIREMENTS

- A. Fireproofing: Provide intumescent thin-film fire protection systems tested by an independent testing agency in accordance with ASTM E119 and acceptable to authorities having jurisdiction (AHJ).
 - 1. Provide assemblies listed by UL or FM and bearing listing agency label or mark.
- B. Structural Steel Columns: Fire resistance rating of hourly rating as indicated on the drawings.

2.03 MATERIALS

- A. Fire Resistive Coating System: Thin-film intumescent fire protection system for structural steel.
 - 1. Surface Burning Characteristics: Tested in accordance with ASTM E84.
 - a. Flame Spread Index (FSI): 25, maximum.
 - b. Smoke Developed Index (SDI): 50, maximum.
 - 2. For Interior Use:
 - a. VOC Content: Less than 500 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
- B. Protective and Decorative Top Coating: As recommended by fireproofing manufacturer for exposure and substrate conditions.
 - 1. Provide product approved for use in food processing facilities.
 - 2. Color and Gloss: As selected by Architect.
 - 3. Coordinate with paint as specified in Section 09 9123 for color and sheen to match between intumescent fireproof coating and adjacent painted surfaces.
- C. Sealers and Primer: As required by tested and listed assemblies, and recommended by fireproofing manufacturer to suit specific substrate conditions.
- D. Reinforcement: Glass fiber fabric matching type used in tested and listed assemblies.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 APPLICATION

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

3.04 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 4000 - Quality Control Requirements and Section 01 4533 - Code-Required Special Inspections and Procedures.
 - 1. Arrange for testing of installed intumescent fire protection by an independent testing laboratory using magnetic pull-off dry film thickness gauge in accordance with SSPC-PA 2, and ensure it meets requirements of authorities having jurisdiction (AHJ).
 - 2. Submit field test reports promptly to Contractor and Architect.
- B. Repair or replace intumescent fire protection at locations where test results indicate fireproofing does not meet specified requirements.

3.05 CLEANING

- A. Immediately after installation of fireproofing in each area, remove overspray and fallout from other surfaces and clean soiled areas.

3.06 PROTECTION

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

END OF SECTION

SECTION 07 8400 FIRESTOPPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

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

1.03 RELATED REQUIREMENTS

- A. Section 01 7300 - Cutting and Patching.
- B. Section 07 0553 - Fire and Smoke Assembly Identification.
- C. Section 07 8100 - Applied Fire Protection.
- D. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.04 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
- B. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- C. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems.
- D. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies.
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- G. ITS (DIR) - Directory of Listed Products.
- H. FM 4991 - Approval Standard for Firestop Contractors.
- I. FM (AG) - FM Approval Guide.
- J. SCAQMD 1168 - Adhesive and Sealant Applications.
- K. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems.
- L. UL (DIR) - Online Certifications Directory.
- M. UL (FRD) - Fire Resistance Directory.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Sustainable Design Submittal: Submit VOC content documentation for all non-preformed materials.
- E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Certificate from authority having jurisdiction indicating approval of materials used.
- H. Installer Qualification: Submit qualification statements for installing mechanics.

1.06 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by manufacturer.
 - 2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
 - 3. Verification of minimum three years documented experience installing work of this type.
 - 4. Verification of at least five satisfactorily completed projects of comparable size and type.
 - 5. Licensed by local authorities having jurisdiction (AHJ).

1.07 MOCK-UP

- A. Install one firestopping assembly representative of each fire rating design required on project.
 - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
 - 2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.
- B. Obtain approval of authorities having jurisdiction (AHJ) before proceeding.
- C. If accepted, mock-up will represent minimum standard for the Work.
- D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.08 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Prohibited Materials: Do not use asbestos.
- C. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- D. Mold and Mildew Resistance: Provide firestoppping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

- E. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- F. Fire Ratings: Refer to drawings for required systems and ratings.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

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

2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

- A. Concrete and Concrete Masonry Walls and Floors:
 - 1. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
 - a. 2 Hour Construction: UL System HW-D-0039; Specified Technologies Inc. ES Elastomeric Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0181; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - c. 2 Hour Construction: UL System HW-D-1037; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - 2. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Floor:
 - a. 2 Hour Construction: UL System HW-D-0268; Hilti CP 606 Flexible Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0312; Specified Technologies Inc. SIL silicone sealant.
 - 3. Concrete/Concrete Masonry Wall to Wall Joint Systems That Have Movement Capabilities (Dynamic):
- B. Gypsum Board Walls:
 - 1. Wall to Wall Joints That Have Not Been Tested For Movement Capabilities (Static):
 - a. 1 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - 2. Wall to Wall Joints That Have Movement Capabilities (Dynamic):
 - a. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.

3. Top of Wall Joints at Underside of Steel Beam and Concrete Over Metal Deck Floor with Sprayed On Fireproofing:
 - a. 1 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
4. Top of Wall Joints at Underside of Flat Concrete:
 - a. 1 Hour Construction: UL System HW-D-0371; Specified Technologies Inc. SpeedFlex Joint Profile System.
 - b. 1 Hour Construction: UL System HW-D-0689; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - c. 1 Hour Construction: UL System HW-D-0696; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - d. 1 Hour Construction: UL System HW-D-0757; Hilti CFS-TTS Top Track Seal.
5. Top of Wall Joints at Concrete Over Metal Deck:
 - a. 1 Hour Construction: UL System HW-D-0099; Specified Technologies Inc. SpeedFlex Joint Profile System.
 - b. 1 Hour Construction: UL System HW-D-0749; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - c. 1 Hour Construction: UL System HW-D-0256; Tremco, TREMstop Acrylic Firestop Sealant.
6. Top of Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
 - a. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 1 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.
7. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Cut to Fit Ribs:
 - a. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
8. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Not Cut to Fit:
 - a. 1 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

2.04 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

- A. Blank Openings:
 1. In Floors or Walls:
 - a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-0136; Specified Technologies Inc. SSM mortar.
- B. Penetrations Through Floors or Walls By:
 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-8055; Specified Technologies Inc. SSP Firestop Putty.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-1090; Specified Technologies Inc. SSP Firestop Putty.
 - b. 2 Hour Construction: UL System C-AJ-1198; Specified Technologies Inc. SIL silicone sealant.
 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:

- a. 2 Hour Construction: UL System C-AJ-2167; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
 - c. 2 Hour Construction: UL System C-AJ-2106; Specified Technologies Inc. SSW wrap strips.
- 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3213; Specified Technologies Inc. LCC Intumescent Firestop Collars.
 - b. 2 Hour Construction: UL System W-J-3046; Specified Technologies Inc. SSP Firestop Putty.
 - c. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
- 5. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System C-AJ-4094; Hilti CFS-BL Firestop Block.
- 6. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 604 Self-Leveling Firestop Sealant or CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
 - b. 2 Hour Construction: UL System C-AJ-5087; Specified Technologies Inc. SSS Intumescent Firestop Sealant.
 - c. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE IMAX intumescent Firestop Sealant.
- 7. HVAC Ducts, Uninsulated:
 - a. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- C. Penetrations Through Floors By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System F-A-8012; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade or CFS-S SIL SL Firestop Silicone Sealant Self-Leveling.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-1110; Specified Technologies Inc. CID cast-in devices.
 - 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-2065; Hilti CP 680-P Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-2246; Specified Technologies Inc. CID cast-in devices.
 - 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System F-A-3033; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-3032; Specified Technologies Inc. Ready Split Sleeve.
 - 5. Electrical Busways:
 - a. 2 Hour Construction: UL System F-A-6002; Hilti CP 604 Self-Leveling Firestop Sealant.
 - 6. Insulated Pipes:
 - a. 2 Hour Construction: UL System F-A-5015; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-5041; Specified Technologies Inc. CID cast-in devices.
- D. Penetrations Through Walls By:
 - 1. Uninsulated Metallic Pipe, Conduit, and Tubing:

- a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- 2. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3095; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
 - c. 2 Hour Construction: UL System W-J-3090; Specified Technologies Inc. SSP Firestop Putty.
- 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- 4. HVAC Ducts, Uninsulated:
 - a. 2 Hour Construction: UL System W-J-7092; Specified Technologies Inc. FyreFlange HVAC Firestop Angle.
 - b. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE MAX Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
- 5. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.05 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 - 1. 1 Hour Construction: UL System W-L-0020; Specified Technologies Inc. Composite Sheet.
 - 2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-8025; Specified Technologies Inc. LCI Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System W-L-1049; Specified Technologies Inc. SSS Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 1 Hour Construction: UL System W-L-2048; Specified Technologies Inc. SSW wrap strips.
 - b. 1 Hour Construction: UL System W-L-2074; Specified Technologies Inc. SSC collars.
 - c. 1 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - d. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 4. Electrical Cables Not In Conduit:

- a. 1 Hour Construction: UL System W-L-3024; Specified Technologies Inc. SSP Firestop Putty.
- b. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
- c. 1 Hour Construction: UL System W-L-3076; Specified Technologies Inc. SSS Intumescent Firestop Sealant.
- d. 1 Hour Construction: UL System W-L-3358; Specified Technologies Inc. Ready-Sleeve.
- e. 1 Hour Construction: UL System W-L-3369; Specified Technologies Inc. EZ Firestop Grommet.
- 5. Cable Trays with Electrical Cables:
 - a. 1 Hour Construction: UL System W-L-4008; Specified Technologies Inc. SSB Intumescent Firestop pillows.
 - b. 1 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
- 6. Insulated Pipes:
 - a. 1 Hour Construction: UL System W-L-5014; Specified Technologies Inc. SSS Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- 7. HVAC Ducts, Insulated:
 - a. 1 Hour Construction: UL System W-L-7164; Specified Technologies Inc. FyreFlange HVAC Firestop Angle.
 - b. 1 Hour Construction: UL System W-L-7238; Specified Technologies Inc. FyreFlange HVAC Firestop Angle.
 - c. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.06 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: See drawings for required systems and ratings.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 INSTALLATION

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

3.04 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

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

END OF SECTION

SECTION 07 9200 JOINT SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.03 RELATED REQUIREMENTS

- A. Section 07 1300 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.
- B. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
- C. Section 07 8400 - Firestopping: Firestopping sealants.
- D. Section 07 9100 - Preformed Joint Seals: Precompressed foam, gaskets, and strip seals.
- E. Section 08 7100 - Door Hardware: Setting exterior door thresholds in sealant.
- F. Section 08 8000 - Glazing: Glazing sealants and accessories.
- G. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- H. Section 09 3000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.
- I. Section 23 3100 - HVAC Ducts and Casings: Duct sealants.

1.04 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.
- C. ASTM C834 - Standard Specification for Latex Sealants.
- D. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- E. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
- F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- G. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- I. ASTM C1311 - Standard Specification for Solvent Release Sealants.
- J. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- K. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

- L. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.
- M. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
- N. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- O. SCAQMD 1168 - Adhesive and Sealant Applications.
- P. SWRI (VAL) - SWR Institute Validated Products Directory.
- Q. UL 263 - Standard for Fire Tests of Building Construction and Materials.

1.05 SUBMITTALS

- A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 8. Sample product warranty.
 - 9. Certification by manufacturer indicating that product complies with specification requirements.
 - 10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.
- B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- D. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- F. Installation Plan: Submit at least four weeks prior to start of installation.
- G. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- H. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
- I. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- J. Installation Log: Submit filled out log for each length or instance of sealant installed.
- K. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.
- L. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- C. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 - 1. Adhesion Testing: In accordance with ASTM C794.
 - 2. Compatibility Testing: In accordance with ASTM C1087.
 - 3. Allow sufficient time for testing to avoid delaying the work.
 - 4. Deliver to manufacturer sufficient samples for testing.
 - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
 - 6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- D. Installation Plan: Include schedule of sealed joints, including the following.
 - 1. Joint width indicated in Contract Documents.
 - 2. Joint depth indicated in Contract Documents; to face of backing material at centerline of joint.
 - 3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
 - 4. Approximate date of installation, for evaluation of thermal movement influence.
 - 5. Installation Log Form: Include the following data fields, with known information filled out.
 - a. Date of installation.
 - b. Name of installer.
 - c. Actual joint width; provide space to indicate maximum and minimum width.
 - d. Actual joint depth to face of backing material at centerline of joint.
 - e. Air temperature.
- E. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
 - 1. Identification of testing agency.
 - 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Test date.
 - b. Copy of test method documents.
 - c. Age of sealant upon date of testing.
 - d. Test results, modeled after the sample form in the test method document.
 - e. Indicate use of photographic record of test.
- F. Field Quality Control Plan:
 - 1. Visual inspection of entire length of sealant joints.
 - 2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
 - a. For each different sealant and substrate combination, allow for one test every 12 inches in the first 10 linear feet of joint and one test every 24 inches thereafter.
 - b. If any failures occur in the first 10 linear feet, continue testing at 12 inches intervals at no extra cost to Owner.
 - 3. Field testing agency's qualifications.

4. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.
- G. Field Adhesion Test Procedures:
 1. Allow sealants to fully cure as recommended by manufacturer before testing.
 2. Have a copy of the test method document available during tests.
 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- H. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
 1. Record results on Field Quality Control Log.
 2. Repair failed portions of joints.
- I. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
 1. Sample: At least 18 inches long.
 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
 3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.07 WARRANTY

- A. Correct defective work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other

- flanking sound paths.
- 1) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
- c. Other joints indicated below.
- 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Type 1 - Exterior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
 - 1. Type 1G - Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
 - 2. Type 1G - Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing.
- C. Type 2 - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
 - 1. Type 2E - Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
 - 2. Type 2C - Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
 - 3. Type 2B - Wall, Ceiling, and Floor Joints Where Tamper-Resistance is Required: Non-sag tamper-resistant polyurethane sealant.
 - 4. Type 2A - Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 - 5. Type 2F - In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
 - 6. Type 2D - Wall, Ceiling, and Floor Joints Where Tamper-Proof is Required: Non-sag epoxy sealant.
 - 7. Type 2J - Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
 - 8. Type 2H - Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.
- D. Interior Wet Areas: restrooms; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".
- F. Areas Where Tamper-Resistance is Required: kitchen and laundry areas.
- G. Areas Where Tamper-Proof is Required: All rooms associated with Booking and Arrest Processing including Holding Cells, inmate areas such as Cells, inmate Common Areas and other areas where inmates will spend time.

2.02 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors: As selected by the Architect.

2.03 NONSAG JOINT SEALANTS

- A. Type A - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: White.
 - 2. Manufacturers:
 - a. ADFAST Corporation; ADSEAL KB 4800 Series: www.adfastcorp.com/#sle.
 - b. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.

- c. Sika Corporation; Sikasil GP: www.usa-sika.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Type B - Tamper-Resistant, Silyl-Terminated Polyurethane (STPU) Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 12 1/2 percent, minimum
 - 2. Hardness Range: 25 to 30, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Service Temperature Range: Minus 40 to 180 degrees F.
 - 5. Manufacturers:
 - a. Pecora Corporation; DynaFlex SC (Security Sealant): www.pecora.com/#sle.
 - b. Sika Corporation; SikaHyflex-150 LM: www.usa-sika.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Type C - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Service Temperature Range: Minus 40 to 180 degrees F.
 - 5. Manufacturers:
 - a. Pecora Corporation; DynaTrol II: www.pecora.com/#sle.
 - b. Sika Corporation; Sikaflex-15 LM: www.usa-sika.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC: www.tremcosealants.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Type D - Tamper-Proof Epoxy Sealant: ASTM C881/C881M, Type I and III, Grade 3, Class B and C; two-component.
 - 1. Hardness Range: In excess of 80, Shore D, when tested in accordance with ASTM C661.
 - 2. Compressive Strength: 11,000 psi, when tested in accordance with ASTM D695.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Service Temperature Range: 40 to 100 degrees F.
 - 5. Manufacturers:
 - a. Pecora Corporation; DynaPoxy EP-1200 Two-Part Epoxy Security Sealant: www.pecora.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Type E - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
 - 1. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Manufacturers:
 - a. Franklin International, Inc; Titebond GREENchoice Acoustical Smoke & Sound Sealant: www.titebond.com/#sle.
 - b. Hilti, Inc; CP 506 Smoke and Acoustical Sealant: www.us.hilti.com/#sle.
 - c. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.
 - d. Sherwin-Williams Company; 950A Siliconized Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- F. Type F - Acrylic Latex Sealant: ASTM C834; for use as acoustical sealant and in firestopping systems for expansion joints and through penetrations.
 - 1. Color: Standard colors matching finished surfaces.

2. Fire Rated System: Complies with UL 263 and ASTM E119 with UL fire resistance classifications.
3. Manufacturers:
 - a. Pecora Corporation; AC-20 FTR (Fire and Temperature Rated): www.pecora.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- G. Type G - Non-Curing Butyl Sealant: Solvent-based, single component, non-sag, non-skinning, non-hardening, non-bleeding; non-vapor-permeable; intended for fully concealed applications.
 1. Manufacturers:
 - a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: www.pecora.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 SELF-LEVELING SEALANTS

- A. Type H - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
 1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 3. Color: Gray.
 4. Service Temperature Range: Minus 40 to 180 degrees F.
 5. Manufacturers:
 - a. Sika Corporation; Sikaflex-1c SL: www.usa-sika.com/#sle.
 - b. Sika Corporation; Sikaflex-2c SL: www.usa-sika.com/#sle.
 - c. W. R. MEADOWS, Inc; POURTHANE SL: www.wrmeadows.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Type J - Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
 1. Composition: Multi-component, 100 percent solids by weight.
 2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
 3. Color: Concrete gray.
 4. Joint Width, Minimum: 1/8 inch.
 5. Joint Width, Maximum: 1/4 inch.
 6. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.
 7. Manufacturers:
 - a. Euclid Chemical Company; EUCO 700: www.euclidchemical.com/#sle.
 - b. Nox-Crete Inc; DynaFlex 502: www.nox-crete.com/#sle.
 - c. W.R. Meadows, Inc; Rezi-Weld Flex: www.wrmeadows.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 1. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 2. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
 3. Manufacturers:

- a. ADFAST Corporation; ADSEAL BR-2600 (Backer Rod): www.adfastcorp.com/#sle.
 - b. Nomaco, Inc: www.nomaco.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
 - C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
 - D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
 - E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.
 - 1. Provide primers that are appropriate for for porous or non-porous surfaces as required.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
 - 3. Record each test on Preinstallation Adhesion Test Log as indicated.
 - 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 - 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.

- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

**SECTION 08 0671
DOOR HARDWARE SCHEDULE**

PART 1 PRODUCTS

1.01 SCHEDULED DOOR HARDWARE

PART 1 PRODUCTS

			1. MK - MCKINNEY		
			2. PE - PEMKO		
			3. RO - ROCKWOOD		
			4. SA - SARGENT		
			5. RF - RIXSON		
			6. NO - NORTON		
			7. - OTHER		
			8. SU - SECURITRON		

HARDWARE SETS

SET: 1.0

DOORS: CS304

2	CONTINUOUS HINGE	CFM_SLF-HD1 X LENGTH REQUIRED		PE	
1	CONCEALED VERT ROD EXIT, NIGHTLATCH	DG364 16 AD8610 106	US32D	SA	
1	CONCEALED VERT ROD EXIT, EXIT ONLY	DG364 16 AD8610 EO	US32D	SA	
3	CORE	DG3 6300	US15	SA	
2	PULL	RM202 MTG- TYPE 12XHD	US32D	RO	
2	CONC OVERHEAD STOP	6-X36	630	RF	
2	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
1	THRESHOLD	273X224AFGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	PROVIDED BY FRAME SUPPLIER			
2	SWEEP	3452CNB X LENGTH REQUIRED		PE	

1	ASTRAGAL	29324CNB X DOOR HEIGHT		PE	
NOTES:					
SET: 2.0					
DOORS: FA301A					
1	CONTINUOUS HINGE	CFM_SLF-HD1 PT X LENGTH REQUIRED		PE	
1	ELECTRIFIED MORTISE LOCK	DG364 NAC-82271 LNL	US26D	SA	ELEC
1	CORE	DG3 6300	US15	SA	
1	CONC OVERHEAD STOP	6-X36	630	RF	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
1	THRESHOLD	273X224AFGT X LENGTH REQUIRED X MSES25SS		PE	
1	GASKETING	PROVIDED BY FRAME SUPPLIER			
1	SWEEP	3452CNB X LENGTH REQUIRED		PE	
1	CARD READER	PROVIDED BY SECURITY SUPPLIER			
1	ELECTRIC POWER TRANSFER	EL-CEPT		SU	ELEC
1	ELECTROLYNX HARNESS	QC-C**** X LENGTH REQUIRED		MK	ELEC
1	ELECTROLYNX HARNESS	QC-C1500P		MK	ELEC
1	POSITION SWITCH	DPS2 - M / W-BK		SU	ELEC
1	POWER SUPPLY	AQL4-R8E1		SU	ELEC
1	WIRING DIAGRAM	ELEVATION AND POINT TO POINT AS SPECIFIED			
NOTES: SYSTEM OPERATIONAL NARRATIVE DOOR IS NORMALLY CLOSED AND SECURE.					

PRESENTING VALID CREDENTIAL TO WALL MOUNTED CARD READER TEMPORARILY UNLOCKS LEVER-ALLOWING ENTRY.
 ENTRY ALSO POSSIBLE VIA KEY OVERRIDE.
 REQUEST TO EXIT SWITCH, INCORPORATED IN INSIDE LEVER, TEMPORARILY SHUNTS DOOR POSITION SWITCH-ALLOWING EGRESS WITHOUT INDICATING ALARM AT MONITORING STATION.
 DOOR POSITION SWITCH, INCORPORATED IN LOCKSET, MONITORS DOOR OPEN/CLOSE STATUS.
 LEVER REMAINS LOCKED DURING POWER LOSS. (FAIL SECURE).

SET: 3.0

DOORS: FA301B

1	CONTINUOUS HINGE	CFM_SLF-HD1 PT X LENGTH REQUIRED		PE	
1	ELECTRIFIED MORTISE LOCK	DG364 NAC-82271 LNL	US26D	SA	ELEC
1	CORE	DG3 6300	US15	SA	
1	CONC OVERHEAD STOP	6-X36	630	RF	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
1	GASKETING	PROVIDED BY FRAME SUPPLIER			
1	CARD READER	PROVIDED BY SECURITY SUPPLIER			
1	ELECTRIC POWER TRANSFER	EL-CEPT		SU	ELEC
1	ELECTROLYNX HARNESS	QC-C**** X LENGTH REQUIRED		MK	ELEC
1	ELECTROLYNX HARNESS	QC-C1500P		MK	ELEC
1	POSITION SWITCH	DPS2 - M / W-BK		SU	ELEC
1	POWER SUPPLY	AQL4-R8E1		SU	ELEC
1	WIRING DIAGRAM	ELEVATION AND POINT TO POINT AS SPECIFIED			

NOTES:
 SYSTEM OPERATIONAL NARRATIVE

DOOR IS NORMALLY CLOSED AND SECURE.
 PRESENTING VALID CREDENTIAL TO WALL MOUNTED CARD READER TEMPORARILY
 UNLOCKS LEVER-ALLOWING ENTRY.
 ENTRY ALSO POSSIBLE VIA KEY OVERRIDE.
 REQUEST TO EXIT SWITCH, INCORPORATED IN INSIDE LEVER, TEMPORARILY SHUNTS DOOR
 POSITION SWITCH-ALLOWING EGRESS WITHOUT INDICATING ALARM AT MONITORING
 STATION.
 DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSE STATUS.
 LEVER REMAINS LOCKED DURING POWER LOSS. (FAIL SECURE).

SET: 4.0

DOORS: FM126B

6	HINGE (HEAVY WEIGHT)	T4A3786	US26D	MK	
1	SURFACE VERT ROD EXIT	DG364 12 NB8706 ETNJ	US32D	SA	
1	FIRE SURFACE VERT ROD EXIT, EXIT ONLY	12 NB8710 EO	US32D	SA	
1	CORE	DG3 6300	US15	SA	
2	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
2	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
2	WALL STOP	403 (OR) 441CU (AS CONDITION REQUIRES)	US26D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
1	ASTRAGAL	S771C X DOOR HEIGHT		PE	

SET: 5.0

DOORS: FM126A

3	HINGE (HEAVY WEIGHT)	T4A3786	US26D	MK	
1	RIM EXIT DEVICE	DG364 12 8806 ETNJ	US32D	SA	
1	CORE	DG3 6300	US15	SA	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
1	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	WALL STOP	403 (OR) 441CU	US26D	RO	

		(AS CONDITION REQUIRES)			
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 6.0					
DOORS: FA305A, FA305B					
3	HINGE (HEAVY WEIGHT)	T4A3786	US26D	MK	
1	RIM EXIT DEVICE, CLASSROOM	DG364 12 8813 ETNJ	US32D	SA	
1	CORE	DG3 6300	US15	SA	
1	SURFACE CLOSER	CPS7500	689	NO	
1	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 7.0					
DOORS: FM127					
6	HINGE	TA2714	US26D	MK	
1	FLUSH BOLT	2842 / 2962 (AS REQUIRED)	US26D	RO	
1	DUST PROOF STRIKE	570	US26D	RO	
1	STOREROOM/CLOSET LOCK	DG364 8204 LNL	US26D	SA	
1	CORE	DG3 6300	US15	SA	
1	COORDINATOR	2600 SERIES X MOUNTING BRACKETS AS REQUIRED	BLACK	RO	
2	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
2	SURFACE CLOSER	CLP7500	689	NO	
2	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	WALL STOP	403 (OR) 441CU (AS CONDITION REQUIRES)	US26D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	

1	ASTRAGAL	S771C X DOOR HEIGHT		PE	
SET: 8.0					
DOORS: FA306, FA311, FA312, FA313, FA314, FA315, FA316					
3	HINGE	TA2714	US26D	MK	
1	OFFICE/ENTRY LOCK	DG364 8205 LNL	US26D	SA	
1	CORE	DG3 6300	US15	SA	
1	WALL STOP	403 (OR) 441CU (AS CONDITION REQUIRES)	US26D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
1	DOOR BOTTOM	STC411APK X LENGTH REQUIRED		PE	
SET: 9.0					
DOORS: FA310A, FA310B					
3	HINGE	TA2714	US26D	MK	
1	CLASSROOM LOCK	DG364 8237 LNL	US32D	SA	
1	CORE	DG3 6300	US15	SA	
1	WALL STOP	403 (OR) 441CU (AS CONDITION REQUIRES)	US26D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
1	DOOR BOTTOM	STC411APK X LENGTH REQUIRED		PE	
SET: 10.0					
DOORS: FA308, FA321, FA324, IS309					
3	HINGE	TA2714	US26D	MK	
1	CLASSROOM LOCK	DG364 8237 LNL	US32D	SA	
1	CORE	DG3 6300	US15	SA	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
1	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	WALL STOP	403 (OR) 441CU	US26D	RO	

		(AS CONDITION REQUIRES)			
3	SILENCER	608		RO	
SET: 11.0					
DOORS: FA322, FA323					
3	HINGE (HEAVY WEIGHT)	T4A3786	US26D	MK	
1	CLASSROOM SECURITY INTRUDER LOCK	CPC DG364 8238 LNL	US26D	SA	
2	CORE	DG3 6300	US15	SA	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
2	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	WALL STOP	403 (OR) 441CU (AS CONDITION REQUIRES)	US26D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 12.0					
DOORS: FA317, FA318, FA325, IS308					
3	HINGE	TA2714	US26D	MK	
1	PRIVACY LOCK	V20 8265 VN1L	US26D	SA	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
2	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	WALL STOP	403 (OR) 441CU (AS CONDITION REQUIRES)	US26D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 13.0					
DOORS: CS306, CS307					
3	HINGE	TA2714	US26D	MK	

1	PRIVACY LOCK	V20 8265 VN1L	US26D	SA	
1	SURF OVERHEAD STOP	10-X36	630	RF	
1	SURFACE CLOSER	PR7500 / 7500 (AS CONDITION REQUIRES)	689	NO	
2	KICK PLATE	K1050 10" HIGH CSK BEV	US32D	RO	
1	GASKETING	S88BL (HEAD & JAMBS)		PE	
SET: 14.0					
DOORS: FM123B					
1	CYLINDER	AS REQUIRED	US15	SA	
1	CORE	DG3 6300	US15	SA	
NOTES:					
COORDINATE REQUIRED CYLINDER TYPE WITH DOOR SUPPLIER. REMAINING HARDWARE TO BE PROVIDED BY THE DOOR SUPPLIER.					

END OF SECTION

**SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Hollow metal borrowed lites glazing frames.

1.03 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware.
- B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- C. Section 08 8853 - SECURITY GLAZING: Security glass for doors and borrowed lites.
- D. Section 09 9123 - Interior Painting: Field painting.

1.04 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. ASCE: American Society of Civil Engineers.
- C. HMMA: Hollow Metal Manufacturers Association.
- D. NAAMM: National Association of Architectural Metal Manufacturers.
- E. NFPA: National Fire Protection Association.
- F. SDI: Steel Door Institute.
- G. UL: Underwriters Laboratories.

1.05 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- J. ASTM C476 - Standard Specification for Grout for Masonry.
- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities.
- M. ITS (DIR) - Directory of Listed Products.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames.
- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames.
- P. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames.
- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- S. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives.
- T. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- U. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.
- V. UL (DIR) - Online Certifications Directory.
- W. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
- X. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.06 SUBMITTALS

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- C. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: www.steeldoor.org/sdicertified.php/#sle.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Door Edge Profile: Manufacturers standard for application indicated.
 - 4. Typical Door Face Sheets: Flush. Refer to Door Schedule for additional information.
 - 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
 - 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire-Rated:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
 - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 3. Door Thickness: 1-3/4 inches, nominal.
 - 4. Door Face Sheets: Flush.
- C. Fire-Rated Doors:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.

2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.
5. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
 - a. Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
 - c. Label: Include the "S" label on fire-rating label of door.
6. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
7. Door Thickness: 1-3/4 inches, nominal.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 1. Frame Metal Thickness: 14 gauge, 0.067 inch, minimum.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
 1. Fire Rating: Same as door, labeled.
 2. Frame Metal Thickness: 14 gauge, 0.067 inch, minimum.
- E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- G. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- H. Frames in Masonry Walls: Size to suit masonry coursing to fill opening without cutting masonry units.
- I. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
 1. Fire-Rated Frames: Comply with fire rating requirements indicated.

2.06 ACCESSORIES

- A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 1. Size: As indicated on drawings.
 2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.

- B. Glazing: As specified in Section 08 8000, factory installed.
- C. Astragals for Double Doors: Specified in Sections 08 7100, 08 8853, and 087163
 - 1. Fire-Rated Doors: Steel, shape as required for fire rating.
- D. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
 - 1. Manufacturers:
 - a. ITW Commercial Construction North America; ITW CCNA-Buildex Tek Select Series: www.ITWBuildex.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- F. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- G. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 7100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- F. Comply with glazing installation requirements of Section 08 8000.
- G. Comply with glazing installation requirements of Section 08 8853 for security glazing.
- H. Coordinate installation of electrical connections to electrical hardware items.
- I. Touch up damaged factory finishes.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

**SECTION 08 1416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

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

1.03 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.

1.04 REFERENCE STANDARDS

- A. AWI (QCP) - Quality Certification Program.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.

1.05 SUBMITTALS

- A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS).
- C. Samples: Submit two samples of door construction, 6 by 6 inches in size cut from top corner of door.
- D. Samples: Submit two samples of door veneer, 6 by 6 inches in size illustrating wood grain, stain color, and sheen.
- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Specimen warranty.
- J. Warranty, executed in Owner's name.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
 - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- D. Quality Certification:

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

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 WARRANTY

- A. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 1. Masonite Architectural: www.architectural.masonite.com/#sle.
 2. Oregon Door: www.oregondoor.com/#sle.
 3. VT Industries, Inc: www.vtindustries.com/#sle.

2.02 DOORS AND PANELS

- A. Doors: See drawings for locations and additional requirements.
 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 1. Provide solid core doors at each location.
 2. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 1. Vertical Edges: Any option allowed by quality standard for grade.
 2. "Running Match" each pair of doors and doors in close proximity to each other.

2.05 DOOR CONSTRUCTION

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

- 2. Provide solid blocking for other throughbolt hardware.
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- E. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Stain: As selected by Architect.
 - c. Sheen: Satin.

2.07 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 1113.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

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

3.04 ADJUSTING

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

3.05 SCHEDULE

- A. See Door and Frame Schedule appended to this section.

END OF SECTION

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**SECTION 08 3100
ACCESS DOORS AND PANELS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Wall and ceiling mounted access units.

1.03 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Openings in masonry.
- B. Section 13 4263 - Precast Concrete Detention Cell Modules: Mechanical components requiring access.

1.04 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products.
- B. UL (FRD) - Fire Resistance Directory.

1.05 SUBMITTALS

- A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- B. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- C. Manufacturer's Installation Instructions: Indicate installation requirements.
- D. Project Record Documents: Record actual locations of each access unit.

1.06 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Wall-Mounted Units:
 - 1. Location: As needed.
 - 2. Panel Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
 - 3. Size: 16 by 16 inches minimum.
 - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 5. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
 - 6. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 - 7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- B. Wall-Mounted Units in Wet Areas:
 - 1. Location: As needed.
 - 2. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
 - 3. Size: 16 by 16 inches.

4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
 6. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- C. Fire-Rated Wall-Mounted Units:
1. Location: As needed.
 2. Wall Fire-Rating: As indicated on drawings.
 3. Panel Material: Steel.
 4. Size: 16 by 16 inches, or as scheduled on the drawings.
 5. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.
- D. Ceiling-Mounted Units:
1. Location: As needed.
 2. Panel Material: Steel.
 3. Size - Lay-In Grid Ceilings: To match module of ceiling grid.
 4. Size - Other Ceilings: 16 by 16 inches.
 5. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
- E. Wall-Mounted Security Units:
1. Location: In all inmate areas.
 2. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
 3. Size: 16 by 16 inches, or as scheduled on the drawings.
 4. Door/Panel and Frame: Heavy duty.
 5. Detention type deadbolt lock with paracentric key.

2.02 WALL AND CEILING MOUNTED ACCESS UNITS

- A. Manufacturers:
1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
 - a. Multipurpose Access Panel: Activar/JL Industries TM.
 - b. High-Security (7 ga) Access Panel: Activar/JL Industries HSP.
 2. ACUDOR Products Inc: www.acudor.com/#sle.
 - a. Wall and Ceiling Mounted Units: ACUDOR DW-5058.
 - b. Security Access Doors: ACUDOR SD-6000.
 3. Cendrex, Inc: www.cendrex.com/#sle.
 - a. Wall-Mounted Units: Cendrex AHD, flush door, face frame, hinged.
 - b. Security Rated Units: Cendrex PHS, high security.
 4. Karp Associates, Inc; DSB-123SD: www.karpinc.com/#sle.
 5. Nystrom, Inc; High Security: www.nystrom.com/#sle.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
1. Style: Exposed frame with door surface flush with frame surface.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 2. Door Style: Single thickness with rolled or turned in edges.
 3. Frames: 16 gauge, 0.0598 inch, minimum thickness.
 4. Heavy Duty Frames: 10 gauge, 0.134 inch, minimum thickness.
 5. Single Steel Sheet Door Panels: 1/16 inch, minimum thickness.
 6. Heavy Duty Single Steel Sheet Door Panels: 10 gauge, 0.134 inch, minimum thickness.

7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
8. Steel Finish: Primed.
9. Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors.
10. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - c. Handle: No handle.
 - d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.
 - e. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
 - f. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 INSTALLATION

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

3.04 SCHEDULE

- A. Provide access doors/panels for access to all valves, unions, traps, switches, relays, water closet and lavatory chair carriers, air splitter dampers, airstream thermostats, humidistats, air vents, expansion joints, dampers, control boxes, fan powered boxes, coils, duct accessories, clean-outs, and other control items for the food service, mechanical, electrical and plumbing work which are concealed in wall, partition or ceiling construction.

END OF SECTION

**SECTION 08 3313
COILING COUNTER DOORS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Non-fire-rated coiling counter doors and operating hardware.

1.03 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.04 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.
- B. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.
- C. Samples: Submit two slats, 4 inch long, illustrating shape, color and finish texture.
- D. Manufacturer's Instructions: Indicate installation sequence and installation, adjustment, and alignment procedures.
- E. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Coiling Counter Doors:
 - 1. C.H.I. Overhead Doors; Model 6544 (aluminum): www.chiohd.com/#sle.
 - 2. Raynor Garage Doors; DuraShutter, Model CA ; DuraShutter, Model CA: www.raynor.com/#sle.
 - 3. Cornell Inovative Door Solutions; Model ESC10: www.cornelliron.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING COUNTER DOORS

- A. Coiling Counter Doors, Non-Fire-Rated: Aluminum slat curtain.
 - 1. Mounting: As indicated on drawings.
 - 2. Provide integral frame and sill of same material and finish.
 - 3. Nominal Slat Size: 1-1/4 inches wide.
 - 4. Slat Profile: Flat.
 - 5. Finish, Aluminum: Anodized.
 - 6. Guides: Formed track; same material and finish unless otherwise indicated.
 - 7. Hood Enclosure: Manufacturer's standard; aluminum.
 - 8. Manual hand crank lift operation.
 - 9. Locking Devices: Slide bolt on inside.

2.03 MATERIALS

- A. Curtain Construction: Interlocking, single thickness slats.

1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
 3. Aluminum Slats: ASTM B221 (ASTM B221M), aluminum alloy Type 6063; minimum thickness 0.05 inch.
- B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.
1. Aluminum Guides: Extruded aluminum channel, with wool pile runners along inside.
- C. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
- D. Lock Hardware:
1. Slide Bolt: Provide on both-jamb sides, extending into slot in guides.
- E. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

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

3.03 TOLERANCES

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

3.04 ADJUSTING

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

3.05 CLEANING

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

END OF SECTION

**SECTION 08 3323
OVERHEAD COILING DOORS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Overhead coiling doors, operating hardware, non-fire-rated and exterior; electrically operated.
- B. Wiring from electric circuit disconnect to operator to control station.

1.03 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 26 0533.13 - Conduit for Electrical Systems: Conduit from electric circuit to operator and from operator to control station.
- C. Section 26 0583 - Wiring Connections: Power to disconnect.

1.04 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ITS (DIR) - Directory of Listed Products.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts.
- G. NEMA MG 1 - Motors and Generators.
- H. UL (DIR) - Online Certifications Directory.
- I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.05 SUBMITTALS

- A. Product Data: Provide general construction, electrical equipment, and component connections and details.
- B. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- C. Manufacturer's Qualification Statement.
- D. Installer's Qualification Statement.
- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

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

- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

1.07 WARRANTY

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Overhead Coiling Doors:
 - 1. C.H.I. Overhead Doors; Model 6222: www.chiohd.com/#sle.
 - 2. Cornell Iron Works, Inc; Thermiser Insulated Rolling Door, ESD20: www.cornelliron.com/#sle.
 - 3. Raynor Garage Doors; DuraCoil, Model IF: www.raynor.com/#sle.
 - 4. Wayne-Dalton, a Division of Overhead Door Corporation; 800C ADV: www.wayne-dalton.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING DOORS

- A. Exterior Coiling Doors: Steel slat curtain.
 - 1. Capable of withstanding positive and negative wind loads of 20 psf, without undue deflection or damage to components.
 - 2. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 7.2.
 - 3. Nominal Slat Size: 2 inches wide by required length.
 - 4. Finish: Factory painted, color as selected.
 - 5. Guide, Angles: Galvanized steel.
 - 6. Hood Enclosure: Manufacturer's standard; primed steel.
 - 7. Electric operation.
 - 8. Mounting: Within framed opening.
 - 9. Locking Devices: Chain lock keeper on inside.

2.03 MATERIALS AND COMPONENTS

- A. Metal Curtain Construction: Interlocking slats.
 - 1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 - 2. Curtain Bottom for Slat Curtains: Fitted with angles to provide reinforcement and positive contact in closed position.
 - 3. Weatherstripping for Exterior Doors: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
 - 4. Steel Slats: Minimum thickness, 22 gauge, [] inch; ASTM A653/A653M galvanized steel sheet.
 - a. Galvanizing: Minimum G90 coating.
- B. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- C. Guides - Angle: ASTM A36/A36M metal angles, size as indicated.
 - 1. Hot-dip galvanized in compliance with ASTM A123/A123M.
- D. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.

1. Minimum thickness; 24 gauge, [] inch.
2. Prime paint.

2.04 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
 1. Mounting: Side mounted.
 2. Motor Enclosure:
 - a. Exterior Coiling Doors: NEMA MG 1, Type 4; open drip proof.
 3. Motor Rating: 1/3 HP; continuous duty.
 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 6. Controller Enclosure: NEMA 250, Type 4.
 7. Opening Speed: 12 inches per second.
 8. Brake: Manufacturer's standard type, activated by motor controller.
 9. Manual override in case of power failure.
 10. Refer to Section 26 0583 for electrical connections.
- C. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
 1. 24 volt circuit.
 2. Surface mounted, at interior door jamb.
 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
- D. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 26 0583.
- F. Complete wiring from disconnect to unit components.
- G. Install enclosure and perimeter trim.

3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.

- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.04 ADJUSTING

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

3.05 CLEANING

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

END OF SECTION

**SECTION 08 3463
DETENTION DOOR AND FRAMES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Steel plate security doors/access doors and frames.
- B. Security hollow metal (SHM) doors, frames, and borrowed light frames.
- C. Stainless Steel security hollow metal (SSS) doors and frames.
- D. Appurtenances for detention doors: food openings, food passes, observation panels and view panels, as shown and scheduled.

1.03 RELATED SECTIONS

- A. Section 03 4100 - Precast Structural Concrete.
- B. Section 04 2000 - Unit Masonry for inserting anchors into masonry construction.
- C. Section 05 0527 - SECURITY METAL FASTENERS.
- D. Section 05 5000 - Metal Fabrications for metal mesh in metal frames.
- E. Section 07 9200 - Joint Sealants.
- F. Section 08 7163 - Detention Door Hardware for door hardware for detention doors.
- G. Section 08 8853 - SECURITY GLAZING.
- H. Section 09 9600 - High-Performance Coatings.
- I. Section 13 4263 - PRECAST CONCRETE DETENTION CELL MODULES.
- J. Products furnished but not installed under this section include:
 - 1. Embedded security door frames, security and non-security access panel frames, and security frames for all interior detention glazing.
 - 2. Security hollow metal frames, sidelights, control room framing, and glass framing.
 - 3. Security borrowed lights and vision panels.

1.04 DEFINITIONS

- A. Minimum-Thickness Steel: Indicated as the specified minimum thicknesses for base metal without coatings, according to HMMA 803.
- B. Nominal-Thickness Stainless Steel: Indicated as the specified thicknesses for which over- and under-thickness tolerances apply, according to ASTM A480/A480M.
- C. Nominal Surface of Floor Covering: Top surface of floor; for resilient tile and carpet, nominal surface of floor covering is defined as top of concrete slab.

1.05 PERFORMANCE REQUIREMENTS

- A. Detention Doors and Frame Assemblies: Provide detention doors and frames that comply with the project requirements, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project:
- B. Detention Frames: Provide sidelight and borrowed-light detention frames that comply with ASTM F1592 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.

- C. Exterior Door Assemblies: Door assemblies installed in exterior walls shall be capable of resisting the following design requirements:
 - 1. Basic Wind Speed of 100 MPH.
 - 2. Building and Structure Classification Category: III.
 - 3. Exposure Category: C.
 - 4. U-value = 0.61 maximum.

1.06 SUBMITTALS

- A. Completed Acceptance Certification confirming compliance with requirements of this Section.
 - 1. Test Data confirming compliance with Performance Requirements of this Section.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, label compliance, wind speed performance requirements, and finishes for each type of detention doors and frames specified.
- C. Shop Drawings: In addition to requirements below, provide a schedule using same reference numbers for details and openings as those on Drawings:
 - 1. Security Hollow Metal Drawings:
 - a. Include a schedule in security hollow metal drawings for all doors, door frames and window frames.
 - b. Provide drawings with appropriate elevations, sections and details, including anchorage details.
 - c. Indicate the proper hardware set and labeling, or label construction, of doors and frames.
 - d. Indicate the removable stop side for glazing stops.
 - e. Provide the location and template details for specialty items such as intercom and electric hardware.
 - f. Note the unloading, storing and installation procedures for detention hollow metal.
- D. Coordination Drawings: Drawings of each detention door and frame, drawn to scale, on which connections and interface with electrified and/or pneumatic control systems are shown.
- E. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.
- F. Qualification Data: For qualified Installer.
- G. Welding certificates, current for all workers on project.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for detention doors and frames. Indicate metal thickness of each component of tested assembly and describe construction methods.
- I. Field quality-control reports documenting inspections of installed products.

1.07 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 detention doors and frames from single source from single manufacturer.
- 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."
 - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
- D. Smoke-Control Detention Door Assemblies: Comply with NFPA 105.

- E. Coordination Meetings: Conduct coordination meetings at Project site to comply with requirements in Section 01 3110 - Project Meetings.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver detention doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver detention frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Inspect units, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Architect; otherwise, remove and replace damaged items as directed.
- D. Store detention doors and frames under cover at building site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber.
 - 1. Provide minimum 1/4-inch space between each stacked unit to permit air circulation.

1.09 COORDINATION

- A. Coordinate installation of anchorages 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 concrete or masonry. Deliver such items to Project site in time for installation.

1.10 MAINTENANCE TOOLS

- A. Tool Kit: Provide six sets of tools for use with security fasteners, each packaged in a compartmented kit configured for easy handling and storage.

PART 2 PRODUCTS

2.01 SLIDING HOLLOW METAL SECURITY DOOR AND WALL SYSTEM

- A. General: Sliding door and framing system shall be of sizes and type indicated, including anchorage materials, framing, glass and glazing, hardware and locking and operating devices as specified or indicated.
- B. Wall System Assembly: Shall be field assembled in accordance with requirements of "Security Type Hollow Metal Doors, Frames and Borrowed Light Frames" hereinafter specified.
- C. Security Sliding Doors: Size(s) and type(s) indicated, shop prepared to receive specified hardware shall be of similar construction, factory assembled, and pre-glazed.
- D. Security Glass: As furnished and installed under Section 08 8853.
- E. Structural Design: The glass wall system shall be capable of withstanding lateral loads of 600 lbs. at any point in system without permanent damage.
- F. The Contractor may fabricate this equipment himself in accordance with requirements as specified in Article titled GENERAL FINISH REQUIREMENTS below, and as detailed on Contract Drawings, complete with security glazing.

2.02 STEEL PLATE SECURITY DOORS/ACCESS DOORS AND FRAMES

- A. Available 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. Habersham Metal Products Co.
 - 2. Southern Folger Detention Equipment Co.
 - 3. Trussbilt
 - 4. Willo Products Co.

- B. When steel plate security doors are indicated, they shall be of size and type indicated, reinforced to receive scheduled hardware.
- C. Single Plate Access Doors and Frames: Doors shall be constructed of 7 gauge thick open-hearth steel plate, ASTM A29/A29M, on the exterior side, framed and stiffened with 1 1/4-inch flange as indicated. Frames shall be 7 gauge steel plate, profiled as indicated.
- D. Plate Door Frames: Shall be constructed of not less than 3/16-inch thick bent steel plate, full wall thickness, complete with stops and jamb anchors as indicated.

2.03 DETENTION PANELS

- A. Provide fixed detention panels of same materials, construction, and finish as specified for adjoining detention frame.

2.04 SECURITY TYPE HOLLOW METAL DOORS, FRAMES AND BORROWED LIGHT FRAMES

- A. It is the intent, that security sheet steel (hollow metal) doors, frames, and borrowed light frames, are part of the Detention Equipment Contract.
- B. Acceptable Manufacturers:
 - 1. Acme Architectural Products.
 - 2. American Steel Products.
 - 3. Chief Industries.
 - 4. Habersham Metal Products Company
 - 5. Slate.
 - 6. Trussbilt.
 - 7. Willo Products Company, Inc.
- C. Door Design: Flush face sheets, maximum security type.
- D. Clearances: Edge clearance shall be provided as follows:
 - 1. Between door and frame: 1/8 inch maximum at head and hinge jamb and 1/4 inch maximum at lock jam.
 - 2. Under door:
 - a. No threshold: 5/8 inch maximum.
 - b. Over threshold: 1/4 inch maximum.
 - 3. Between vertical meeting edges of pairs of doors: 1/8 inch maximum.
- E. Door Construction:
 - 1. Interior Doors: Commercial quality, cold rolled steel, ASTM A1008/A1008M or ASTM A1011/A1011M, free from warpage and buckle, leveled sheets of 14 gauge steel.
 - 2. Exterior Doors: Commercial quality stainless steel, type 304, #4 finish, ASTM A240/A240M free from warpage and buckle leveled sheet of 14 gauge thickness.
 - 3. Stainless Steel Doors: ASTM A240/A240M stainless-steel sheet, austenitic stainless steel, Type 304, 14 gauge thickness.
 - 4. Stainless Steel Mesh: Square weave wire mesh, stainless steel type 304, 2 inch square opening, 0.25 inch wire diameter, lockcrimp weave.
 - 5. Edge Profiles:
 - a. Vertical Edges: Seamless, continuously heli-arc welded and ground smooth, beveled 1/8-inch in 2 inches.
 - b. Top and Bottom Edges: Closed with continuous, full width, recessed 1/2 inch x 1-1/2 inch x 10 gauge steel channel, welded to both faces.
 - 6. Internal Stiffeners: Continuous, full height and width, formed or rolled, truss or hat-shaped.
 - a. Spacing: Approximately 4 to 6 inches on centers.
 - b. Spot welded to both face sheets at approximately 3 inch intervals maximum.

- c. Spaces between stiffeners shall be sound-deadened, full height and width of door, with insulation.
- 7. Armored Perimeter: Provide 1/8-inch thick continuous channel edge framing around complete door perimeter, weld to face sheets at 3-inch maximum intervals.
- 8. Door Sizes: Thickness and sizes as listed in "Door Schedule".
- 9. Hardware Reinforcements:
 - a. Doors shall be mortised where required, reinforced, drilled and tapped at factory for fully templated prison and commercial hardware, in accordance with "Hardware Schedule" specified herein.
 - b. Minimum thickness of hardware reinforcing plates shall be as follows:
 - 1) Mortise Hinges: 3/16 inch thick, offset to suit hinge thickness, welded inside hinge edge perimeter channel, provided with additional "U" brace at top hinge.
 - 2) Surface Hinges: 10 gauge
 - 3) Door Pulls and Other Surface Hardware: 12 gauge.
 - 4) Locks, Bolts, Panic Devices: 12 gauge.
- 10. Glass Openings, Observation Panels and Food Passes (as applicable):
 - a. Sizes and locations as indicated.
 - b. Channel framed, 1/2-inch by 1 1/2-inch by 10 gauge steel reinforced and welded to face sheets.
 - c. Stops: Fixed stops on inmate side of door and removal stops on opposite side, secured with maximum security type screws.
- F. Door Frame and Borrowed Light Frame Construction:
 - 1. Design: Combination buck, frame and integral stop, sizes and shapes detailed.
 - 2. Construction:
 - a. Interior Frames: Brake-form hot or cold-rolled steel sheets of 12 gauge thickness.
 - b. Stainless Steel and Exterior Frames: Brake-form stainless steel sheets of 12 gauge thickness.
 - c. Type: Where possible, provide mitered and continuously welded trim faces, where butting is required, joints shall be fully welded and face of joint filled with body putty. Grind all welds smooth.
 - d. Size: Conform to wall thickness, as detailed.
 - e. Glass Stops: Provide glass stops, types as detailed.
 - 1) Fixed integral stop shall occur on maximum security (inmate) side, with removable stop on opposite side.
 - f. For each mortise hinge, a minimum 3/16-inch by 1 1/2-inch by 10-inch steel reinforcement plate shall be welded to the frame and completely drilled and tapped. An additional 3/16-inch angle shall be welded to the hinge reinforcement and to the trim of the frame at the top hinge only.
 - 3. Special Head/Jamb Compartment: Shall be an integral part of the door frame, provide for doors indicated or as required.
 - a. Shall house the electro-mechanical locking device and intercom speakers.
 - b. Where indicated, compartment shall be located at head of frame, with compartment door hinged on a continuous hinge and equipped with a three-point cam lock for service.
 - c. Where indicated, compartment shall be located at jamb of frame, with door plate security screw attached for service.
 - d. Provide cut-outs for speaker back box and intercom switch.
 - 4. Electrical Requirements: Provide appropriate frames with wire access holes, including conduit and boxes shop pre-placed and installed, for combination door and borrowed light frame.
 - 5. Masonry Anchors: Design frames specifically to suit various conditions of installation.

- a. Floor Anchors: Use floor anchors typically. Substitute base anchors where floor anchors are unsuitable.
 - b. Jamb Anchors: Provide four adjustable "T" anchors per jamb, unless otherwise indicated.
- G. Fire Rated Doors and Frames:
 - 1. When scheduled, fabricate fire rated doors and frames of materials in accordance with requirements of Underwriters Laboratories, Inc. (UL).
 - 2. Place UL labels, of class required by "Door Schedule", where visible when metal work is installed.
 - 3. Where hardware requirements prohibit label application, provide certification of UL construction.

2.05 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 thickness of metal. 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. Fabricate multiple-opening detention frames with mullions that have closed tubular shapes and with no visible seams or joints.
- D. Exterior Detention Doors: Provide weep-hole openings in bottom of detention doors to permit entrapped moisture to escape. Seal joints in top edges of detention doors against water penetration.
- E. 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 as indicated or, if not indicated, according to NAAMM HMMA 831.
- F. Factory cut openings in detention doors.
- G. 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.

2.06 GENERAL FINISH REQUIREMENTS

- A. Finish detention doors and frames after assembly.
- B. Finish doors in compliance with Section 09 9600.

2.07 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 SPPC-PAINT 20, to comply with ASTM A780/A780M.
- B. Factory Priming for Field-Painted Finish: Apply primer specified below immediately after surface preparation and pretreatment.
 - 1. Shop Primer: Comply with Section 09 9600.

2.08 STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- B. Factory Priming for Field-Painted Finish: Apply primer specified below immediately after surface preparation and pretreatment.
 - 1. Shop Primer: Comply with Section 09 9600.
- C. Asphaltic Paint: Asphalt emulsion, water-resistant, resilient coating.
 - 1. Solids: 60 to 63 percent.
 - 2. VOC's; None.
 - 3. Finish: Sem-gloss - nontacky.
 - 4. Flash Point: None.
 - 5. Manufacturer:
 - a. Royal Coatings, Inc; www.royalcoatings.net.
 - b. Substitutions: See Section 011600 - Product Requirements.

2.09 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention doors and frames.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention frame connections before detention frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention doors and frames.
- 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 noncompliance with specified requirements. Reinspect after repair or replacement.
 - 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory.
- B. Prior to 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.

3.03 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 per anchorage device manufacturer's written instructions.
 1. Masonry Anchors: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 2. Embedded Anchors: Install embedded plates in wall surrounding frame openings to match frame angle locations.
 3. Postinstalled Expansion Anchors: Drill holes in existing construction at locations to match bolt locations and install bolt expansion shields or inserts.
- C. Assemble detention frames fabricated in sections. 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. Coat inside of frames to be installed in masonry or to be grouted, with asphaltic paint, prior to installation. Apply at thickness of 5 mils WFT and cures to 3 mils DFT.
- E. 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 and spreaders, 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 solidly anchored. Reinstall jamb faces using security fasteners.
 2. Postinstalled Expansion 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.
- F. 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.

- 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 08 8853 unless otherwise indicated.

3.04 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.
- E. Owner will select one detention door at random from detention doors delivered to Project and have it cut in half or otherwise taken apart for verification that construction complies with requirements.
- F. Test Method: Verify weld strength by prying or chiseling door apart at edge seams, end channels, or stiffeners. Not more than five percent of welds may fail test.
 - 1. If tested door fails, replace or rework all detention doors to bring them into compliance at Contractor's expense.
 - 2. If tested door passes, replace tested door at Contractor's expense.

3.05 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. 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.
- D. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

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SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.

1.03 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- B. Section 07 2500 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
- C. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- D. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.
- E. Section 08 8000 - Glazing: Glass and glazing accessories.
- F. Section 12 2400 - Window Shades: Attachments to framing members.

1.04 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document).
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).
- F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- I. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- J. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.

- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- C. Samples: Submit two samples 4 x 8 inches in size illustrating finished aluminum surface, glass, glazing materials.
- D. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- E. Field Quality Control Submittals: Report of field testing for water penetration.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

- A. Front-Set Style, Thermally-Broken:
 - 1. Basis of Design: Kawneer.
 - 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
- B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
 - 1. YKK AP America.
 - 2. Tubelite, Inc.
- C. Substitutions: See Section 01 6000 - Product Requirements.

1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.02 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING

- A. Front-Set Style:
 1. Basis of Design: Kawneer; Trifab VersaGlaze 451T.
 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
- B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
 1. YKK AP America.
 2. Tubelite, Inc.

2.03 BASIS OF DESIGN -- SWINGING DOORS

- A. Wide Stile, Monolithic Glazing:
 1. Basis of Design: Kawneer.
 2. Thickness: 1-3/4 inches.
- B. Wide Stile, Insulating Glazing, Thermally-Broken:
 1. Basis of Design: Kawneer.
 2. Thickness: 2-1/4 inches.
- C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
 1. YKK AP America.
 2. Tubelite
- D. Substitutions: See Section 01 6000 - Product Requirements.
 1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.04 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 1. Finish: High performance organic coatings.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 2. Finish Color: As selected by Architect from manufacturer's standard line.
 3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

9. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and heel bead of glazing compound.
- B. Performance Requirements
 1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
 3. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
 4. Overall U-value Including Glazing: 0.44 Btu/(hr sq ft deg F), maximum.

2.05 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
- B. Glazing: As specified in Section 08 8000.
- C. Swing Doors: Glazed aluminum.

2.06 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.
- D. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch minimum thickness.
- E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- F. Glazing Accessories: As specified in Section 08 8000.

2.07 FINISHES

- A. High Performance Organic Coating: AAMA 2604; multiple coats, thermally cured fluoropolymer system.
- B. Color: As selected by Architect from manufacturer's standard range.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.08 HARDWARE

- A. For each door, include weatherstripping and sill sweep strip.
- B. Other Door Hardware: As specified in Section 08 7100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.

- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install glass in accordance with Section 08 8000, using glazing method required to achieve performance criteria.
- J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 01 4000 - Quality Control Requirements, for general testing and inspection requirements.
- C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

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

END OF SECTION

**SECTION 08 5653
SECURITY WINDOWS**

PART 1 GENERAL

1.01 RELATED DOCU

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Detention windows, with glazing.

1.03 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Installation of anchorage items embedded in masonry.
- B. Section 08 8853 - SECURITY GLAZING: Glazing for detention windows.

1.04 REFERENCE STANDARDS

- A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- B. ASTM A627 - Standard Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional Facilities.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- F. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- G. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- I. NFRC 100 - Procedure for Determining Fenestration Product U-factors.
- J. SSPC-Paint 33 - Coal-Tar Mastic Coating, Cold Applied.

1.05 SUBMITTALS

- A. Product Data: Manufacturer's published data showing materials, construction details, dimensions of components, and finishes.
- B. Shop Drawings: Drawings prepared specifically for this project, showing plans, elevations, sections, details of construction, anchorage to other work, hardware, and glazing.
 - 1. For new work show required opening dimensions and allowance for field deviation.
 - 2. For field glazed windows, include detailed instructions for glazing installation.
- C. Test Reports: Test reports for specific window model and glazing to be furnished, showing compliance with specified requirements; window and glazing may be tested separately, provided window test sample adequately simulates the glazing to be used.
 - 1. Include testing agency qualifications.
 - 2. For structural, forced entry, and ballistic tests, provide details on method of anchorage to test frame.

3. Reports for thermal requirements may be based on calculations, in accordance with the specified standard.
- D. Samples for Selection of Applied Finishes: Color charts for factory finishes.
- E. Samples:
 1. Actual sections of frame members, at least 12 inch long, showing finish, weatherstripping, and fasteners.
- F. Coordination Drawings: For each window opening, show locations and details of items necessary to anchor windows that must be installed by others, in sufficient detail that installer of those items can do so correctly without reference to the actual window itself.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. For Tool-Resisting Steel Bars: Material test reports.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm with at least 5 years experience in the manufacture of windows of the type specified and able to provide test reports showing that their standard manufactured products meet the specified requirements; custom designed products not acceptable.
- B. Testing Agency Qualifications: Independent testing agency able to show experience in conducting tests of the type specified and:
 1. Qualified according to ASTM E329 for testing tool-resisting steel.
 2. Accredited by NFRC for thermal testing.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- D. Welder Qualifications: Qualified in accordance with AWS procedures for type of welding required.

1.07 WARRANTY

- A. Provide manufacturer's warranty agreeing to repair or replace windows and window components that fail within ten years after Date of Substantial Completion due to, but not limited to, the following:
 1. Structural failure, failure of welds, and deterioration of metals and finishes beyond that expected under detention use and normal weathering.
 2. Failure of glazing due to excessive deflection of supporting members under wind load.
 3. Air leakage exceeding performance specified.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Detention Windows:
 1. Hope's Windows, Inc30 Series, Fixed, STB30: www.hopeswindows.com/#sle.
 2. Southern Steel Detention Equipment: www.southernsteel.com/#sle.
 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ASSEMBLIES

- A. Security and Detention Windows:
 1. Dimensions, profiles, features, and performance specified and indicated on drawings are required; do not deviate unless specifically approved by Architect under substitution procedures specified in Section 01 6000.
 2. Design to fit openings indicated on drawings; design to accommodate deviation of actual construction from dimensions indicated on drawings.

3. Fabricate frames and sash with corners mitered or coped full depth with concealed welded joints.
 4. Design anchorages to provide performance equivalent to that required for window unit; provide anchorages at least equivalent to those by which the tested units were anchored to the test frame.
 5. Design interface between frame and adjacent construction so that gap between them has at least the equivalent performance as specified for window; coordinate with anchorage requirements; custom testing is not required.
 6. Separate dissimilar metals to prevent corrosion by galvanic action by painting contact surfaces with primer or with sealant or tape recommended by manufacturer for the purpose.
 7. Weld components before finishing and in concealed locations, to greatest extent possible; minimize distortion and discoloration of finish; remove residue of welding; grind exposed welds smooth and finish to match.
 8. Label units to indicate which side is which, such as inside/outside or secure/non-secure; use labels that are removable after installation but durable enough not to be lost during delivery, storage, handling, and installation.
- B. Exterior Window Requirements: Comply with following performance requirements as well as other specified criteria.
1. Structural Performance: Capable of withstanding wind loads as specified by code without permanent deformation or breakage of components, when tested in accordance with ASTM E330/E330M.
 2. Deflection of Framing Members Supporting Glass: Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edge to less than 1/175 of their lengths under specified design load.
 3. Air Leakage of Fixed Windows: 0.10 cfm/sq ft maximum leakage for fixed window units when tested at 6.27 psf pressure difference in accordance with ASTM E283/E283M.
 4. Water Penetration: None, when tested in accordance with ASTM E331 at test pressure difference of 2.86 psf.
 5. Thermal Performance: Whole-window U-value of [] Btu/sq ft h degF at 15 mph exterior wind velocity and winter condition temperatures.
 - a. Test in accordance with ASTM C1199 and AAMA 1503.
 - b. Determine U-value according to NFRC 100.
 6. Provide thermally improved construction using integral, low conductance thermal barrier in frame and sash members.
 7. Provide weep holes and internal water passages to conduct infiltrated water to exterior.
 8. Provide water shed members where sash frames lap in wrong direction to shed water.
 9. Provide factory-installed weatherstripping on operable sash.

2.03 DETENTION WINDOWS

- A. Detention Windows: Factory-assembled fixed glazing frames reglazable from exterior without disassembly of ventilator frame; attach removable components with security fasteners that are not removable without the use of appropriate tools.
1. Detention Bars: Vertical 7/8 inch diameter round steel bars at 5 3/4 max. inches on center, with 1/4 inch by 2 inches flat bar perimeter frame.
 - a. Windows of More Than 36 inches (915 mm) in Direction of Main Bars: Flat steel bars, 1/4 by 2 inches, at 12 inches perpendicular to main bars.
 - b. Conceal bars in muntins attached with concealed welds.
 - c. Make bars penetrate perimeter frame with anchors to prevent removal but allow rotation.
 2. Glazing: Laminated type as specified in Section 08 8853; type as required to achieve performance criteria specified.

3. Factory glazed.
4. Framing and Glazing Stops: Formed galvanized steel sheet; with muntins of same material; baked enamel finish.

2.04 ASSEMBLY COMPONENTS

- A. Galvanized Formed Steel Framing: ASTM A653/A653M galvanized to A60/ZF180 coating; 12 gauge, 0.1046 inch minimum base metal thickness.
- B. Detention Bars: Homogeneous tool-resisting steel bars, ASTM A627 round as applicable.
- C. Frame Anchors: Mild steel plates, shapes, or bars, concealed in completed construction; provide anchorage devices as necessary to securely fasten windows to adjacent construction; use security fasteners for exposed anchors.
 1. For Setting in Masonry: Minimum 3/16 inch thick angles or plates, minimum 4 inches long with hooked ends, welded to back of window frame.
 2. Provide minimum of two anchors per side of window plus one additional anchor for each 18 inches or fraction thereof more than 36 inches in height or width.
- D. Weatherstripping: Factory installed; molded EPDM or neoprene.
- E. Glazing Seals: Factory installed; molded EPDM or neoprene compressible gaskets and compression strips.
- F. Security Fasteners: Operable only by tools produced by fastener manufacturer or manufacturer's licensee; head style appropriate to installation conditions, strength, and finish of materials being fastened; use countersunk heads wherever possible.
 1. Drive System: Use not more than one of the following:
 - a. 5-lobe Torx Plus socket head with security pin.
 - b. Standard Torx socket head with security pin.
 - c. Hex socket head with security pin.
 - d. Phillips head with security pin.
 - e. Two-hole drilled spanner head.
 - f. Notched spanner head.
 - g. One-way screw head.
 2. On Steel: Heat-treated alloy steel, with zinc chromate coating at exterior locations and interior wet locations.
- G. Bituminous Paint: Cold-applied asbestos-free asphalt mastic, complying with SSPC-Paint 33; 30 mils, 0.030 inch minimum thickness per coat.
- H. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.05 FINISHES

- A. Steel Finish: Multi-stage pretreatment process followed by electrocoat-applied cathodic epoxy primer, finished with a polyurethane top coat.
- B. Color: As selected by Architect from manufacturer's unlimited color range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that window openings are ready for installation of windows.
- B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.
- C. Notify Architect if conditions are not suitable for installation of windows; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and drawing details.
- B. Install windows in correct orientation (inside/outside or secure/non-secure).
- C. Anchor windows securely in manner so as to achieve performance specified.
- D. Separate metal members from concrete and masonry using bituminous paint.
- E. Set sill members and sill flashing in continuous bead of sealant.

3.03 CLEANING

- A. Clean exposed surfaces promptly after installation without damaging finishes.
- B. Remove and replace defective work.

END OF SECTION

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**SECTION 08 5656
SECURITY WINDOW SCREENS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Security screens, complete with woven rod panels and wire cloth, and insect screens.
- B. Sub-frames and main frames.
- C. Factory applied finish.

1.03 RELATED REQUIREMENTS

- A. Division 01 Section "Special Project Procedures for Detention Facilities".
- B. Section 03 4100 - Precast Structural Concrete.
- C. Section 05 0527 - SECURITY METAL FASTENERS.
- D. Section 09 9600 - High-Performance Coatings

1.04 SUBMITTALS

- A. Completed Acceptance Certification confirming compliance with requirements of this Section.
 - 1. Test Data confirming compliance with Performance Requirements of this Section.
- B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of detention enclosure indicated.
- C. Shop Drawings: Prior to fabrication of each type of detention enclosure, submit Shop Drawings. Include plans, elevations, sections, details, and attachments to other Work. Indicate type of steel for each detention enclosure component.
- D. Product Data: Submit manufacturer's printed installation instructions and recommended procedures.
 - 1. Samples: Submit appropriate size sample, corner, frame, mullion joint, and color of finish.

1.05 PERFORMANCE REQUIREMENTS

- A. Window screen assemblies shall be capable of resisting the following design requirements:
 - 1. Basic Wind Speed of 90 MPH.
 - 2. Exposure Category: B.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design: The operating security screens have been designed around Vantage-Wall Plus as manufactured by the Kane Manufacturing Corporation, Kane, PA. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Jails Correctional Products, Minster, OH.
 - 2. Normet Security Group, Inc., Montgomery AL.
 - 3. Peterson Detention Inc, Orange CA.
 - 4. The GS Company, Baltimore, MD.
 - 5. Willo Products Company, Decatur AL

2.02 MATERIALS

- A. Main Frames: Shall be a built-up tubular type, measuring 1 3/4-inch by 2 1/2-inch consisting of an open channel with fixed concealment plates. The open channel element shall be formed of 12 gauge sheet steel and shall have individual slots along the inner edges to support the woven rod panels. Before installing the woven rod panels the corners of the channel element shall be electric flash welded and ground smooth.
- B. Sub-Frames: Shall be formed of 12 gauge galvanized steel on all four sides. Corners shall be uniformly welded and ground smooth to provide a rigid sub-frame within which the main frame operates.
- C. Concealment Plates: 12 gauge steel cover plates shall be applied to the back of the main frame to conceal the locking mechanism and retain the wire cloth in the Vantage-Wall Plus system. The cover plate shall be attached to the main frame, along both the inner and outer edges, by 1/8" diameter stainless steel blind rivets on 8-inch centers. The inner blind rivet shall penetrate the cover plate and, in reference to Vantage-Wall Plus, the wire cloth and the main frame.
- D. Woven Rod Panels: Shall be fabricated from double crimped 16-2 low carbon mild steel rod, 1/4-inch diameter, woven on 2-inch centers. The woven rod panels shall be installed symmetrically in the main frame and each individual rod shall be welded into each slot where it contacts the main frame.
- E. Wire Cloth Insect Screen: Shall be high tensile strength stainless steel, Type 18-8 alloy, Type 304, woven 12 mesh to the inch from 0.028 inch diameter stainless steel in double crimped. Tensile strength shall not be less than 700 pounds per lineal inch after weaving.

2.03 FINISH

- A. All surfaces, interior and exterior, of sub-frames, main frames and coverplates shall be electrogalvanized, primed, and then receive one coat of electrostatically applied baking enamel finish, in custom color as later selected by Architect.

PART 3 EXECUTION

3.01 INSPECTION

- A. Assure that openings conform with details, dimensions and tolerances shown on detail and approved shop drawings.
- B. Check for conditions which would adversely affect detention screen installation; do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Installation shall be in accordance with manufacturers printed installation instructions and shop drawings.
- B. Set units plumb, level and true to line, without warp or rack of frames.
- C. Install sufficient anchorage devices to securely and rigidly fasten screens to building, without causing detrimental effects to shape and performance.

3.03 TOUCH-UP/CLEANING

- A. Touch-Up: All abraded areas shall be touched up by installer with manufacturers original paint.
- B. Cleaning: Remove debris and equipment from site. Final cleaning of screens by General Contractor

END OF SECTION

SECTION 08 7100 DOOR HARDWARE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames".
 - 2. Division 08 Section "Flush Wood Doors".
 - 3. Division 08 Section "Aluminum-Framed Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies.
 - 3. ANSI/UL 294 – Access Control System Units.
 - 4. ULC-S319 - Electronic Access Control Systems.
 - 5. ULC-60839-11-1, Alarm and Electronic Security Systems - Part 11-1: Electronic Access Control Systems - System and Components Requirements.
 - 6. UL 305 – Panic Hardware.
 - 7. ULC-S132, Emergency Exit and Emergency Fire Exit Hardware.
 - 8. ULC-S533 – Egress Door Securing and Releasing Devices.
 - 9. ANSI/UL 437- Key Locks.
 - 10. ULC-S328, - Burglary Resistant Key Locks.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.04 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 section covering project meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 section covering project meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.06 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.07 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual overhead door closer bodies.
 - 4. Two years for electromechanical door hardware.

1.08 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 1 PRODUCTS

2.01 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.02 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 - 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 - 5. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
 - 1. Manufacturers:
 - a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.03 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
 - 1. Manufacturers:

- a. Securitron (SU) - EL-CEPT Series.
- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
 - 1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
 - 2. Manufacturers:
 - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.

2.04 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 - 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 - 2. Furnish dust proof strikes for bottom bolts.
 - 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 - 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 - 5. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
 - 1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - 1. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 - 2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 - 3. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.05 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.

2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 5. Keyway: Manufacturer's Standard.
- D. Removable Cores: Provide removable cores as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- E. High Security Cylinders: ANSI/BHMA A156.5, Grade 1 High security cylinder tested to UL437, including both pick and drill resistance. Pick resistance to incorporate two or more independent locking mechanisms including a pin tumbler device with six top pin chambers, mushroom-shaped driver pins, and coded sidebar locking mechanism operated independently from the six top pin tumbler device. Drill resistance to incorporate cylinder housing with fixed case-hardened inserts protecting the pin tumbler shear line, cylinder plugs with case-hardened inserts protecting both the pin tumbler shear line and the side bar, mushroom-shaped stainless steel driver pins, and stainless steel side pins. Cylinders to be factory keyed.
1. New high security key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
 2. Manufacturers:
 - a. Sargent (SA) – Degree DG3.
- F. Keying System: Each type of lock and cylinders to be factory keyed.
1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. New System: Key locks to a new key system as directed by the Owner.
- G. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Two (2)
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
- H. Construction Keying: Provide temporary keyed construction cores.
- I. Key Registration List (Bitting List):
1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.06 KEY CONTROL

- A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
1. Manufacturers:
 - a. Lund Equipment (LU).
- B. Electronic Key Management System: Provide an electronic key control system with Stand-alone Plug and Play features including advanced RFID technology. Touchscreen interface with PIN access for keys individually locked in place. Minimum 1,000 system users and 21 iFobs for locking receptors. System shall have a minimum 250,000 audit events screen displayed or ability to be exported via USB port.
1. Manufacturers:
 - a. Medeco (MC).

2.07 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
 - 1. Where specified, provide status indicators with highly reflective color and wording for "locked/unlocked" or "vacant/occupied" with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1" x 0.6" with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.
 - 2. Manufacturers:
 - a. Sargent Manufacturing (SA) – 8200 Series.

2.08 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.09 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 - 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 - 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 - 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 - 5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
 - 6. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch

- retraction is not acceptable.
7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.

2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
 - a. Norton Door Controls (NO) – 7500 Series.

2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 1. Manufacturers:
 - a. Rixson Door Controls (RF).

2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - a. ELECTRONIC ACCESSORIES
- G. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
 - 1. Manufacturers:
 - a. Securitron (SU) - DPS Series.
- H. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.
 - 1. Manufacturers:
 - a. Securitron (SU) - AQL Series.

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 1 EXECUTION

3.01 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.02 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.04 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures" and "Cash Allowances". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
 - 2. Submit documentation of incomplete items in the following formats:
 - a. PDF electronic file.
 - b. Electronic formatted file integrated with the Openings Studio™ door opening management software platform.

3.05 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.06 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.07 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 08 0671, Door Hardware Schedule, for hardware sets.

END OF SECTION

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**SECTION 08 7163
DETENTION DOOR HARDWARE**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SUMMARY

- A. This section includes the following:
 - 1. Detention door hardware.
 - 2. Detention cylinders for doors specified in other Sections including paracentric and mogul locking devices.
- B. Related Sections:
 - 1. Division 08
 - 2. Division 28 Sections for integrated security access control system, including connections to perimeter security, detention door control, intercommunications, and closed-circuit television systems for electrified detention door hardware.

1.03 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. Bullet Resistance: Comply with Level 3 rating when tested according to UL 752; where indicated.
 - a. Listed and labeled as bullet resisting by a testing agency acceptable to authorities having jurisdiction.
 - 2. Tool-Attack Resistance: Comply with small-tool-attack-resistance rating when tested according to UL 1034 and UL 437.
- B. Detention Door Hardware Functional Performance: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Division 28.

1.04 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 detention door hardware.
- B. Shop Drawings: For each type of detention door hardware. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring; differentiate between manufacturer-installed and field-installed wiring for electrified 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.
 - 2. Detail interface between electrified detention door hardware and security controls including, detention monitoring and control, and building control system.
- C. Samples: For each type of exposed finish for each type of detention door hardware indicated below, full size. Tag with full description for coordination with the detention door hardware sets.

Submit Samples before, or concurrent with, submission of the final Door Hardware Schedule.

1. Detention Door Hardware: As follows:
 - a. Detention hinges.
 - b. Detention locks and latches.
 - c. Cylinders and keys.
 - d. Detention operating trim.
 - e. Security door closers.
 - f. Detention floor stops.
 - g. As requested by Architect.
 2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- D. Other Action Submittals:
1. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with detention doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Integrate detention door hardware indicated in "Detention Door Hardware Sets" Article into the Door Hardware Schedule, and indicate complete designations of every item required for each door and opening.
 2. Keying Schedule: Comply with requirements specified in Division 08 Section "Door Hardware." Coordinate detention keying with other door hardware in the final Keying Schedule.
 - a. Indicate each lock and type of key using the following prefixes: "P" for paracentric, "M" for mogul, "HS" for high security and "C" for commercial.
- E. Remaining paragraphs are defined in Division 01 Section "Submittal Procedures" as "Informational Submittals."
- F. Qualification Data: For qualified Installer, supplier and, Architectural Hardware Consultant.
- G. Product Certificates: For each type of electrified detention door hardware, from manufacturer.
1. Certify that detention door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency or performed by a qualified testing agency, for each type of detention lock and latch, security door closer, and sliding detention door device.
- I. Maintenance Data: For each type of detention door hardware to include in maintenance manuals.
- J. Operation and Maintenance Data: For electrified detention door hardware to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Normal remote security operation.
 2. Normal local security operation.
 3. Emergency security operation.
- K. Warranties: Sample of special warranties.
- L. 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.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers 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 and who is or employs a qualified Architectural Hardware Consultant, 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 electrified 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 electrified 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.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for detention door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
 - 1. Detention Door Hardware Consultant Qualifications: Experienced in providing consulting services for electrified detention door hardware installations is currently certified by DHI as an Architectural Hardware Consultant.
- D. Source Limitations for Detention Door Hardware: Obtain each type of detention door hardware from single source from single manufacturer.
 - 1. Provide electrified detention door hardware from same manufacturer as mechanical detention door hardware unless otherwise indicated.
- E. Regulatory Requirements: Comply with provisions of the following:
 - 1. Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ADAABAAG (Americans with Disabilities Act/Architectural Barriers Act-Accessibility Guidelines):
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Security Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 - 2) Sliding Doors: 5 lbf applied parallel to door at latch.
 - 3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches and Locks: Not more than 15 lbf to release the latch.
 - b. Security Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
 - c. Sliding Detention Door Devices: Not more than 50 lbf to slide door to its fully open position with a perpendicular force of 50 lbf against door.
 - 3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application as acceptable by the authorities having jurisdiction.

- F. 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 as accepted by authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
 - 1. Test Pressure: Test at atmospheric pressure.
- G. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Incorporate keying conference decisions into the final Keying Schedule after reviewing detention door hardware keying system including, but not limited to, the following:
 - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key-control system including key exclusivity and duplication control.
 - 4. Address for delivery of keys.
 - 5. Coordinate all keying with the Owner.
- H. Pre-installation Conference: Conduct conference at Project site.
 - 1. Inspect and discuss electrical and control system roughing-in and other preparatory work performed by other trades.
 - 2. Review sequence of operation for each type of electrified 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. Review inspection, testing, and certification procedures.
- I. 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. Bullet Resistance: Comply with Level 3 rating when tested according to UL 752; where indicated.
 - a. Listed and labeled as bullet resisting by a testing agency acceptable to authorities having jurisdiction.
 - 2. Tool-Attack Resistance: Comply with small-tool-attack-resistance rating when tested according to UL 1034 and UL 437.
- J. Detention Door Hardware Functional Performance: Provide detention door hardware with features, functions, and internal equipment required to perform control and monitoring functions indicated in Division 28.

1.06 KEYS FOR SECURITY DETENTION LOCKS

- A. The DEC and security and non-security Hardware Contractor shall be responsible for the safekeeping of all keys for locks provided under this Section, as it pertains to his scope of work. He shall exercise care that the security of the building is not breached through job site loss or theft of keys being used for hardware installation or "fit-up" purposes.
- B. Each key for detention locks shall be die-stamped with identification corresponding to that on the approved key schedule.
- C. Upon completion of his job site work, and prior to final acceptance, the Contractor shall present all keys (as shown on Contract Documents) to the Owner's designated custodian and obtain a signed receipt.

1.07 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 final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver keys to Owner by registered mail or overnight package service. Submit documentation to include chain of custody and receipt of keys by Owner. Submit to Owner and Design Professional.

1.08 WARRANTY

- A. Maintenance Service:
 - 1. Maintenance Tools and Instructions: Furnish two (2) complete sets of specialized tools, and operations and maintenance manuals as needed for the Detention Center's continued adjustment, maintenance, and removal and replacement of detention door hardware, as furnished and installed under this section.
 - 2. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months full maintenance by skilled employees of detention door hardware Installer. Include monthly 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.
 - 3. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detention door hardware that fail in materials or workmanship within specified warranty period.
 - a. Failures include, but are not limited to, the following:
 - 1) Structural failures including excessive deflection, cracking, or breakage.
 - 2) Faulty operation of operators and detention door hardware.
 - 3) Deterioration of metals, metal finishes, and other materials beyond normal weathering or detention use.
- B. Warranty Period: Two (2) years from date of Substantial Completion.
- C. Warranty Period for Continuous-Pin Detention Hinges: 10 years from date of Substantial Completion.
- D. Warranty Period for Security Door Closers: 10 years from date of Substantial Completion.
- E. Extra Materials:
 - 1. Furnish full-size materials that match detention door hardware products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 2. Furnish two (2) complete spare sets of inmate cell door operating mechanism, including right and left hand gears, switches, etc.
 - 3. The Contractor shall deliver spare parts to the Detention Center in quantities to be determined by the Owner. Spare parts would include:
 - a. Door position switches.
 - b. Mogul cylinders.
 - c. Mogul repair kits.
 - d. Mogul tool kits.
 - e. Replacement lever tumblers.
 - f. Builder's hardware cylinders.
 - g. Hinges.
 - h. Closers.
 - i. Locks of different types used during project.

PART 1 PRODUCTS

2.01 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 ADA requirements and accessibility guidelines.

2.02 SECURITY FASTENERS

- A. Operable only by tools produced for use on a specific type of fastener by fastener manufacturer or other licensed fabricator. Drive system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Holo-Krome; a Danaher corporation.
 - b. Safety Socket, LLC.
 - c. Tamper-Pruf Screws.
 - d. Textron Fastening Systems; Textron, Inc.
 - 2. Drive-System Types: Pinned Torx.
 - 3. Fastener Strength: 827 MPa.
 - 4. Socket Button Head Fasteners:
 - a. Heat-treated alloy steel, ASTM F 835M.
 - b. Stainless steel, ASTM F 879M, Group 1 CW.
 - 5. Socket Flat Countersunk Head Fasteners:
 - a. Heat-treated alloy steel, (ASTM F 835M.
 - b. Stainless steel, ASTM F 879M, Group 1 CW.
 - 6. Socket Head Cap Fasteners:
 - a. Heat-treated alloy steel, ASTM A 574M.
 - b. Stainless steel, ASTM F 837M, Group 1 CW.
 - 7. Protective Coatings for Heat-Treated Alloy Steel:
 - a. Zinc and clear trivalent chromium where indicated.
 - b. Zinc phosphate with oil, ASTM F 1137, Grade I, or black oxide unless otherwise indicated.
 - 1) Screws shall be furnished with each hardware item for installation. All exposed screw heads, whether door is open or closed, shall be pinned torx flat-head or

oval head screws unless otherwise indicated. Screws shall be finished to match the applied hardware. Other classes of security screws are inadmissible unless approved by the Contractor's Retained Professional.

2.03 DETENTION HINGES, GENERAL

- A. Quantity: Provide the following unless minimum load bearing weight, duty usage, and other considerations warrant a greater number than that indicated:
 - 1. Two (2) Detention Hinges: For detention doors with heights up to 60 inches.
 - 2. Three (3) Detention Hinges: For detention doors with heights 61 to 90 inches.
 - 3. Four (4) Detention Hinges: For detention doors with heights 91 to 120 inches.
 - 4. For detention doors with heights more than 120 inches, provide four detention hinges, plus one detention hinge for every 30 inches of detention door height greater than 120 inches.
- B. Size: Provide the following, unless otherwise indicated, with detention hinge widths sized for 2-inch detention door thickness and clearances required:
 - 1. Doors up to 42 Inches Wide: Minimum 4-1/2 inches wide by 0.180 inches thick or 5 inches wide by 0.190 inches thick.
 - 2. Doors Greater Than 42 Inches Wide: Minimum 6 inches wide by 0.203 inches thick.
- C. Detention Doors with Security Closers: Unless otherwise indicated, provide antifriction-bearing detention hinges.
- D. Detention Hinge Base Metal: Unless otherwise indicated, provide the following:
 - 1. Exterior Detention Hinges: Stainless steel, with stainless-steel pin.
 - 2. Interior Detention Hinges: Stainless steel, with stainless-steel pin.
 - 3. Detention Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
- E. 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.
- F. Fastening: Comply with the following:
 - 1. Welding: Where indicated, weld hinges to detention doors and frames with continuous fillet weld around three sides of hinge perimeter.
 - 2. Security Fasteners: Provide Pinned Torx socket flat countersunk head machine screws; finish screw heads to match surface of detention hinges. Install into drilled and tapped holes.

2.04 DETENTION HINGES

- A. Access Door Detention Hinges: Heavy weight, plain bearing; fabricated from cast iron or steel; 3/8-inch diameter, case-hardened, fully welded, steel hinge pin; full surface.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Model No. 203FS.
 - b. Folger Adam; Model No. 3FS.
 - c. Airteq Systems; Model No. 603.
 - d. Hager Companies; Model No. 990.
 - e. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Leaves: Drilled for countersunk security fasteners.
 - 2) Size: Minimum 3 by 4 inches by 0.200 inch.
 - 3) Security Grade: 1 to ASTM F 1758.
 - 4) Finish: BHMA 600.
- B. Food-Pass Detention Hinges: Heavy weight, plain bearing; fabricated from cast iron or steel; 9.5-mm diameter, case-hardened, fully welded, steel hinge pin; with applied stop preventing

door from opening more than 32.2 Celsius and supporting door in horizontal position as a shelf; full surface.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Model No. 203FP.
 - b. Folger Adam; Model No. 3FP.
 - c. Airteq Systems; Model No. 603FP.
 - d. Hager Companies; Model No. 992.
 - e. By Door Manufacturer.
 - f. Approved substitution in accordance with the Owner's General Conditions.
 2. Leaves: Drilled for countersunk security fasteners.
 3. Size: Minimum 3 by 4 inches by 0.200 inch.
 4. Security Grade: 1 according to ASTM F 1758.
 5. Finish: BHMA 600.
- C. Half-Surface Detention Hinges: Extra heavy weight; two heavy-duty thrust bearings with hardened-steel ball bearings; fabricated from steel plate; 3/4-inch diameter, case-hardened, fully welded, steel hinge pin.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Model No. 204FMSS.
 - b. Airteq Systems.
 - c. Hager Companies; Model No. IHTHB953.
 - d. Approved substitution in accordance with the Owner's General Conditions.
 2. Leaves: Drilled for countersunk security fasteners.
 3. Size: Minimum 5 by 5-1/4 inches by 1/2 inch.
 4. Security Grade: 1 according to ASTM F 1758.
 5. Finish: BHMA 600.
- D. Full-Surface Detention Hinges: Extra heavy weight; two heavy-duty thrust bearings with hardened-steel ball bearings; fabricated from steel plate; 3/4-inch diameter, case-hardened, fully welded, steel hinge pin.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Model No. 205 FS.
 - b. Folger Adam; Model No. 5FS.
 - c. Airteq Systems, a division of Norment Security Group (AIR); Series 605.
 - d. Brookfield Industries (BI); Series I-8500.
 - e. Maximum Security Products Corp. (MSP); Series 850/855.
 - f. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Leaves: Drilled for countersunk security fasteners.
 - 2) Size: Minimum 5 by 5-1/4 inches by 1/2 inch.
 - 3) Security Grade: 1 according to ASTM F 1758.
 - 4) Finish: BHMA 600.
- E. Continuous-Pin Detention Hinges: Minimum 0.109-inch- thick, stainless-steel hinge leaves with minimum overall width of 4 inches; with 1/4-inch- diameter continuous pin; fabricated to full height of detention door and frame. Finish components after milling and drilling are complete. Fabricate continuous-pin detention hinges to template screw locations.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Markar Architectural Products, Inc., a subsidiary of Adams Rite Manufacturing Co. (MP); Series 3500.
 - b. By Door Manufacturer.
 - c. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Security Grade: 1 according to ASTM F 1758.

- F. Power Transfer Hinge: To supply power from door frames to electric locks on hollow metal doors.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Model No. 204E.
 - b. Folger Adam; Model 4-1/2EH
 - c. Airteq; Model 604FMC-CE
 - d. Approved substitution in accordance with the Owner's General Conditions.
 2. Size: 4 -1/2 by 4-1/2 by 3/16 inches.
 3. Weight: 1.6 Lbs.
 4. Hinge Pin: 5/8 inch diameter O.D. tubing steel.
 5. Electrical: 1 amp capacity, 40 volts maximum.

2.05 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 Security Access Doors: Minimum 5/8-inch latchbolt throw.
 2. Latchbolts: Minimum 3/4-inch latchbolt throw.
 3. Deadbolts: Minimum 1-inch bolt throw.
- E. Detention Lock Trim:
1. Levers: Solid stainless steel.
 2. Knobs: Stainless steel.
 3. Escutcheons for Paracentric Locks: 0.125-inch thick, 3-inch diameter stainless steel with BHMA 626 finish. Attach with security fasteners.
 - a. Style: Single or double wing as required by lock function.
 - b. Provide escutcheons unless otherwise indicated.
 4. Cylinder Shields for Paracentric Locks: 0.125-inch thick, 3-inch diameter stainless steel with BHMA 626 finish and swinging cover to protect keyhole. Attach with security fasteners.
 - a. Style: Single or double wing as required by lock function.
 - b. Provide cylinder shields where indicated.

2.06 MECHANICAL DETENTION LOCKS AND LATCHES

- A. General: The Contractor shall have the responsibility and the specific duty to examine all Contract Documents and furnish the proper hardware for all openings based on functionality and requirements. Mechanical detention lock mountings as follows:
1. Hollow-Metal Detention Doors: Mount detention lock to back of cover plate for installation in lock pocket fabricated into detention door. Attach cover plate to hollow-metal detention door with security fasteners.
 2. Steel-Plate Detention Doors: Mount detention lock to inside surface of enclosure with integrally formed mounting flanges. Attach enclosure to steel-plate detention door with security fasteners.
- B. Utility-Door Mechanical Deadlocks, Paracentric:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Folger Adams; Series 10.
 - b. Southern Steel; Series 1010A
 - c. Airteq Systems; Series 5010/5016
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Function: Lockbolt retracted and extended by six tumbler paracentric cylinder; keyed one side.
 - 2) Lockbolt: 1-1/2 inches high by 3/4 inch thick; 5/8-inch throw.
 - 3) Security Grade: 1.
- C. Utility-Door Mechanical Deadlocks, Mogul:
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Southern Steel; Series 1010AM
 - b. Approved substitution in accordance with the Owner's General Conditions.
 2. Function: Lockbolt retracted and extended by mogul cylinder; keyed one side.
 3. Lockbolt: 1-1/2 inches high by 3/4 inch thick; 5/8-inch throw.
 4. Security Grade: 1.
- D. Mechanical Deadlocks:
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 1080A/1010A,
 - b. Folger Adams; Series 80,
 - c. Airteq Systems; Series 5080/5086
 - d. Approved substitution in accordance with the Owner's General Conditions.
 2. Function: Deadlocked in both locked and unlocked position; lockbolt retracted and extended by six tumbler paracentric cylinder; keyed one side.
 3. Security Grade: 1.
- E. Mechanical Mortise Lock:
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Southern Steel; Series 10500
 - b. Folger Adams; Series D9300.
 - c. Airteq; Series 90000/92000
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Function: Lock bolt operated by key or Lever handle/knob. Keyed one or two sides as required.
 - 2) Lever handles retract lockbolts from one side or both sides.
 - 3) Installed mortise in door.
 - 4) Stainless steel latchbolt.
 - 5) Stainless steel deadbolt.
 - 6) Stainless steel deadlock actuator.
 - 7) Listed and labeled for use on fire doors.
 - 8) Security Grade: 3/4.

2.07 HEAD AND FOOT BOLTS

- A. General: Provide head and foot bolts for the inactive leaf of pairs of swinging hollow metal doors.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 10105
 - b. Folger Adam: Head and Foot Bolts.
 - c. Approved substitution in accordance with the Owner's General Conditions.
 2. Function: Manually operated deadbolts mounted into top and bottom of the door.

3. Additional Requirement: Foot Bolt Receptacle required for floor installation. Specify Southern Steel; Series 10105R, or approved substitute.
4. Function: Actuated by means of a "spanner" type key which extends the bolt into appropriate receptacle in the floor and jamb head.

2.08 ELECTROMECHANICAL DETENTION LOCKS AND LATCHES

- A. General: Provide electromechanical detention locks and latches with factory-wired plug connector with wire pigtail. All interior electromechanical swing door locking devices shall be motorized, all exterior electromechanical swing door locking devices shall be 115VAC solenoid.
 1. Provide security ring for installation of electromechanical detention lock in hollow-metal detention frame, welded to frame or access cover, where indicated.
 2. Equip direct-current solenoid-operated detention locks and latches with diode transient voltage protection at each locking device.
- B. Solenoid-Operated Deadlatches, Mogul:
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Folger Adam Series 120E.
 - b. Southern Steel; Series 10120AE.
 - c. Airteq; Series
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Function: Remote switch activates electric solenoid that retracts latchbolt; automatic latching and deadlocking when door is closed (slam locking). Latchbolt can be mechanically retracted by mogul cylinder; keyed one side or two sides as required.
 - (a) Latchback: Latchbolt remains retracted until door is opened 50-mm, then releases or as long as control switch is activated; latchbolt extends when power is discontinued.
 - (b) Local Electric Key (LEK): Key operates lock electrically when enabled; staff key always operates lock manually and electrically; where indicated.
 - (c) Key Holdback: If latchbolt is retracted by key, it remains retracted until relocked by key.
 - (d) Knob operation retracts latchbolt; always active.
 - (e) If power fails, latchbolt automatically deadlocks (fail-secure).
 - (f) Latchbolt: 1-1/2-inch-high by 3/4-inch thick hardened steel; 1-inch throw.
 - (g) Provide internal deadlock indicator switch.
 - (h) Provide roller-type deadlock actuator.
 - (i) Voltage: 120-V ac.
 - (j) Listed and labeled for use on fire doors.
 - (k) Security Grade: 1.
- C. Motor-Operated Deadlatches, Mogul:
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 120AM,
 - b. Folger Adam; Series 120M,
 - c. Airteq; Series 9924
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) 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 side or two sides as required.
 - (a) Latchback: Latchbolt remains retracted until door is opened 50-mm, then releases or as long as control switch is activated; latchbolt extends when power is discontinued.

- (b) Local Electric Key (LEK): Key operates lock electrically when enabled; staff key always operates lock manually and electrically; where indicated.
- (c) Key Holdback: If latchbolt is retracted by key, it remains retracted until relocked by key.
- (d) Knob operation retracts latchbolt; always active.
- (e) If power fails, latchbolt automatically deadlocks (fail-secure).
- (f) Latchbolt: 1-1/2-inch-high by 3/4-inch thick hardened steel; 1-inch throw.
- (g) Provide internal deadlock indicator switch.
- (h) Provide roller-type deadlock actuator.
- (i) Voltage: 24-V dc.
- (j) Listed and labeled for use on fire doors.
- (k) Security Grade: 1.

D. Motor-Operated Mortise Lock:

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 10600.
 - b. Folger Adam; Series D9300.
 - c. Airteq
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) 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 high-security commercial cylinder; keyed one or two sides as required. Provide as designated in the security hardware schedule.
 - 2) Lever handles retract lockbolts from one side or both sides.
 - 3) Installed mortise in door.
 - 4) Electrically locks and unlocks knobs/lever.
 - 5) Stainless steel latchbolt.
 - 6) Stainless steel deadbolt.
 - 7) Stainless steel deadlock actuator.
 - 8) Listed and labeled for use on fire doors.
 - 9) Security Grade: ¾.

2.09 ELECTROMECHANICAL LOCKING, ELECTROTECHNICAL DOOR MOVEMENT, CORRIDOR SLIDING DOOR DEVICE ASSEMBLIES.

- A. Provide Electromechanical Locking, Electrotechnical Door Movement, Corridor Sliding Door Device Assemblies operated from touchscreen control panels provided under this project. Remote operation from touchscreen control panels activated electric motors to unlock sliding doors and motorized rack and pinion drive mechanisms to open and close doors. Doors lock in open position and deadlock when closed. Provide factory wired cable harness with plug connectors for each motor unit. Provide Pilaster mechanical release and electric keyswitch functionality at each.
- B. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Southern Steel; Series 3165LX.b.PKM-2
 - 2. Folger Adam; Series D3B
 - 3. Airteq; Series 7350
 - 4. Approved substitution in accordance with the Owner's General Conditions.
- C. Functions:
 - 1. Unlock, open and lock open door in not more than seven (7) seconds.
 - 2. Unlock, close and deadlock close door in not more than seven (7) seconds.
 - 3. Stop the movement of any door in mid-travel by applying approximately 40/45 lbs. of pressure on the door.

4. Instantly reverse the direction of the door. In the event the door is blocked, the door shall automatically continue to the open or closed position when the obstruction is removed.
 5. Normal force exerted by a door in travel is 40/45 lbs.
 6. The locking device shall be designed so that there will be no projecting lugs on the receiver column. Door shall automatically deadlock closed at a minimum of three points. Front locking shall not be acceptable.
- D. Manual Operation:
1. In the event of power failure, the door shall have capabilities of being unlocked with a paracentric key from either one or both sides of door.
 2. The paracentric cylinder shall be located within a 10 gauge steel, hip high, manual release pilaster adjacent to the closing jamb of the door. Door can be moved by hand and will automatically lock upon reaching the fully opened or closed position.
 3. Provide electrical mogul key switch at each door to permit full electrical operation to unlock open, lock open, unlock closed, lock closed, stop or reverse sliding door direction at any point of travel. Door must not go to the closed position automatically. The control console provides power to the key switch and must have the ability to override the key switch at any time. The control circuitry must be designed to prohibit the simultaneous operation from the control console and the key switch.
 4. Doors manually unlocked must be freewheeling to permit ease of movement.
- E. Sliding Detention Door Assemblies Features
1. Paint entire assembly, except track, rollers, and drive mechanism with rust inhibitive primer.
 2. Provide adjustable door skirt to minimize floor to door gap; Hinged Housing Covers.
 3. Housing covers shall feature horizontal mechanism housing constructed of 7 gauge steel, housing covers shall be constructed of 10 gauge steel. All opening shall be baffled. Vertical lock bar housing shall be constructed of mild steel and the lock bar shall be constructed of steel, free moving within housing. All hinged housing covers shall be locked to the track box with Torx head w/center pin security screws.
 4. Provide minimum 1/8 HP, 115 VAC motors where required for electromechanical door movement.

2.10 ELECTROMECHANICAL LOCKING, MANUAL DOOR MOVEMENT, SLIDING CELL DOOR DEVICE:

- A. Provide electromechanical locking, manual door movement sliding door device that shall be remote control operated from touchscreen control panels provided under this project. Signal from touchscreen control system shall activate electromechanical lock. Door shall require manual open and closing once remotely opened. Locks shall automatically deadlock when doors are moved to fully closed position. Provide factory wired cable harness for all locking. Provide Pilaster mechanical release and electric keyswitch functionality at each.
- B. Products: Subject to compliance with requirements, provide one of the following:
1. Southern Steel; Series 4110LKM-1,
 2. Airtec Series; 7210,
 3. Or approved equal by Folger Adam,
 4. Approved substitution in accordance with the Owner's General Conditions.
- C. Single Door Function, in an emergency or if power fails, individual doors can be unlocked using a manual release lock located at the door and manually moved.
- D. Provide mogul keyed local electric control at each sliding cell door in pilaster.
- E. Multiple Door Function, each door can be individually unlocked locally or from a remote touchscreen, or unlocked from a touchscreen with other doors as a group. In an emergency or if power fails, doors can be manually operated from local manual key.

- F. Electromechanical lock shall be Southern Steel Series 1058M lockset or approved equal by Airteq or Folger Adam. Approved substitution in accordance with Owner's General Conditions.

2.11 DETENTION HARDWARE CYLINDERS AND KEYING

- A. General: Subject to compliance with requirements, provide cylinders and keying for mogul cylinders by the same manufacturer as for detention locks and latches.
- B. Commercial (Builders' Hardware) Cylinders: As specified in Division 08 Section "Door Hardware."
- C. 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.
- D. Mogul Cylinders: Detention mogul cylinders shall have 2-inch diameter brass bodies, with six-pin, stainless steel tumblers and engaging balls. High-Security Grade, listed and labeled as complying with pick and drill resistant testing requirements in UL 437 (Suffix A); where indicated. Products as provided by the lock manufacturer.
- E. Mortise Locks: Provide High Security mortise locks, UL 437 listed, ANSI A156.5, 1992, Grade 1, (not less than) six-pin cylinders.
- F. Temporary Construction Security: Furnish adequate number of temporary cylinders and keys as required by the Contractor in order to lock all exterior doors as deemed necessary for temporary use and storage. These temporary cylinders will be replaced with permanent cylinders as specified, and will remain the property of the supplier.
- G. Keying System: Supplier shall meet with Owner to determine keying requirements.
- H. All locks of Builder's Hardware, High Security Mortise, and Mogul types are to be incorporated into patented, geographically unique, factory master keyed systems as established for this project.
 - 1. The Contractor shall prepare a proposed key schedule showing recommendations for the keying system layout. The Contractor shall provide the keying system layout sorted by door number and key change in accordance with the Door Hardware Institute's (DHI) "Keying Systems and Terminology". The Contractor shall meet with the Owner to review the key schedule and make desired modifications at a time and location selected by the Owner.
- I. Permanent Cylinders and Keys: Supplier shall meet with Owner to determine requirements of cylinders and keys.
 - 1. All permanent cylinders, except those required for paracentric type, and change keys are to remain in the possession of the Contractor's hardware supplier until not more than two weeks prior to final inspection of the project. The Contractor's authorized representative after notifying and receiving approval shall ensure delivery of cylinders and keys to the project as scheduled. Installation of locksets will occur immediately upon delivery of locksets as scheduled in coordination with the Owner and Contractor. The Owner may elect to witness the installation of the locksets and require the Contractor's authorized representative to sign and date five (5) copies of a receipt-indicating conformance with the Using Agencies requirements.
 - 2. The grandmaster keys (2) for each system will be delivered from the factory directly to a representative of the Detention Center as designated by the Owner by registered mail, return receipt required and a copy furnished to the Contractor. No signature other than that of the designated representative or the authorized signer of controlled products will be acceptable.
- J. Keys and Keying: The Contractor shall meet with the Owner to determine final key and key blank quantities.

1. The Contractor shall furnish temporary blank strike plates for lock bolt receivers to prevent automatic locking of doors where temporary construction cylinders are not used and security at the door during construction is not required.
2. The Contractor shall provide adequate locked storage for all keys assigned to him to ensure the integrity of lock security has not been compromised. If compromised, the Contractor shall re-key all locks affected, and provide new keys at no additional cost to the Owner.
3. High security mortise cylinders shall be keyed in sets and master keyed, grandmaster keyed, etc. to level as directed. Provide not less than five (5) nickel-silver keys for each lock keyed differently. Provide not less than one (1) key per lock plus five (5) additional for locks keyed alike. Provide five (5) keys per room and three (3) keys per master level when multiple inmate cell doors in a single area are keyed alike. The Contractor shall provide one complete set of "B" side cut master keys (3 each) with the use of high security mortise cylinders.
4. Mogul type cylinders shall be keyed in sets and master keyed. Provide not less than five (5) keys for each lock keyed differently. Mogul keys shall be approximately 2 3/8-inches long x 1/8-inches thick of a bronze/copper alloy. Provide not less than one (1) key per lock plus five (5) additional for locks keyed alike, furnish five (5) keys per cell and three (3) keys per master group.
5. Paracentric prison locks shall be keyed in sets, and provided with five (5) keys for each set. Each key shall be no less than 4-1/2" in length. Blade to be 7/8" wide by 5/32" thick. Key to have overlapping paracentric grooves to match similar grooves in cylinder. Handle shall be oval shape to fit hand properly, about 2-1/4" x 1-3/8" in size and separated from the key blade by 1/2" x 1-1/2" shank to provide clearance for authorized user's hand. The entire key shall be made of polished alloy bronze having a tensile strength of not less than 90,000 lbs. and a hardness of the Brinell scale of at least 150. Stamp each number or letter per manufacturer's requirements. Permanently inscribe each key with a visual key-control number and include the following notation: "DO NOT DUPLICATE".

2.12 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 requirements. Coordinate hardware with Division 28 locations as shown within the Construction Documents.
- B. Concealed, Magnetic Door Position Switches: Consisting of actuating magnet mortised into detention door and switch mortised into frame; with stainless-steel faceplates; 24-V dc, factory wired with plug connector. Wire in series with lock monitors. Attach with security fasteners.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 200MRS,
 - b. Folger; Series ASSW-105A,
 - c. Airteq; Series DPS 6200
 - d. Approved substitution in accordance with the Owner's General Conditions.
- C. Strike Indicator Switches: Designed to be mortised behind strike and to indicate whether door is locked or unlocked; enclosed in metal strike box. Wire in series with door position switches. Attach with security fasteners.
 1. Voltage: As indicated.
 2. Locations: Where indicated.
 3. Manufacturer: Same as detention lock.

2.13 DETENTION OPERATING TRIM

- A. Standard: BHMA A156.6, Grade 1.

- B. Surface-Mounted Door Pulls: 8 3/4-inch overall length and 2 1/4-inch projection; attach to door with two security fasteners.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 212C.
 - b. Airteq Systems; Series 612.
 - c. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Material: Cast bronze with finish to be coordinated with Owner.
- C. Flush Door Pulls: 5 inches high by 4 inches wide by 1 inch deep, with 1/8-inch thick faceplate; attach to door with four security fasteners.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 214S.
 - b. Airteq Systems; Series 614.
 - c. By door manufacturer.
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) Material: Formed, wrought, or cast brass/bronze with finish to be coordinated with Owner.
- D. Knob Pulls: 2-inch diameter; fabricated from solid brass with finish to be coordinated with the Owner. Attach with security fasteners.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Southern Steel; Series 215C.
 - b. Airteq Systems; Series 613.

2.14 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. Concealed Security Door Closers:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. LCN Closers; Series 2210.
 - b. Norton Door Controls; Series 7970.
 - c. Yale Commercial Locks and Hardware; Series 4500/4500DPS.
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 1) 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.
 - 2) Cover Plates: Heavy-duty metal, attached with security fasteners.
 - 3) Provide door position switch integral to closer.
- C. Surface-Mounted Security Door Closers:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. LCN Closers; Series 4210 or Series 4510, as required.
 - b. Norton Door Controls; Series 7570 or Series 7770, as required.
 - c. Yale Commercial Locks and Hardware; Series SCR/SCP400 or Series SCR/SCP4400, as required.
 - d. Approved substitution in accordance with the Owner's General Conditions.
 - 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.
- 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.

2.15 DETENTION DOOR STOPS

- A. Detention Floor Stops: 1-1/2-inch-high by 2-inch diameter rubber bumper mounted on steel lag bolt; BHMA A156.16; install in floor with nonshrink grout; for detention doors unless wall or other type stops are indicated. Do not mount floor stops where they will impede traffic. Floor stops shall not be utilized within ACB.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Northwest Specialty Hardware; Series NW 606S
 - b. Burns Manufacturing Incorporated; Series 540.
 - c. Hager Companies; Series 269F.
 - d. Triangle Brass Manufacturing Co.; Series 1209.
 - e. Approved substitution in accordance with the Owner's General Conditions.
- B. Detention Wall Stops (ACB Only)
- C. Detention Wall Stop: 1-1/2-inch-high by 2-inch diameter rubber bumper mounted on 5/8-11 inch by 2 1/2 inch steel lag bolt; BHMA A156.16; install in wall with nonshrink grout; for detention doors unless wall or other type stops are 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; Series NW 606S.
 - b. Approved substitution in accordance with the Owner's General Conditions.

2.16 DETENTION DOOR TRIM

- A. Silencers for Detention Door Frames: Provide silencers equal to BHMA A156.16, Grade 1; neoprene or rubber, minimum 1/2 inch diameter; fabricated for drilled-in application to detention door frame. Utilize Ives SR64 silencer or approved equal.
- B. Weather-stripping: Provide gasketing equal to Reese 797 or Pemko S88, at all head and jams (and astragal if pair) of all 20 minute fire rated openings installed per manufacturers recommendations. After installation, razor cut gasketing into pieces not over 12" in length.
- C. Kick, armor and mop plates shall be equal to Hager series 194S.
 1. Except where otherwise indicated or where narrow bottom rails dictate a smaller size, kickplates shall be 10" high and armor plates 36" high (16" high on labeled doors if armorplate is not UL rated). Width shall be 1 1/2" less than the door width on single doors and 1" less than the door width on double doors. Security fasteners shall be used to attach all kick, armor, and mop plates as provided in inmate accessible areas.
- D. Thresholds: Provide thresholds where required on doors receiving security hardware per details.
 1. Thresholds (Pemko #2005AV): Shall be supplied at all exterior, smoke and fire labeled door openings and installed with flat head torx screws.
 2. Pass-Resistant Thresholds.

2.17 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 the Contractor's Retained Professional.
- 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. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

- C. Fasteners: Provide flat-head security fasteners with finished heads to match surface of detention door hardware unless otherwise indicated.
 - 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 through bolts are used on hollow-metal detention door and frame construction, provide sleeves for each through bolt.
 - 3. 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. 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.
 - 1) Spacers or Sex Bolts: For through bolting of hollow-metal detention doors.
 - 2) Fasteners for Wood Detention Doors: Comply with DHI WDHS.2.

2.18 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 606: Satin brass, clear coated, over brass base metal.
 - 3. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
 - 4. BHMA 630: Stainless steel, satin, over stainless-steel base metal.
 - 5. BHMA 652: Satin chromium plated over nickel, over steel base metal.

PART 1 EXECUTION

3.01 EXAMINATION

- A. Examine detention doors and frames, with Installer and Detention Specialist present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of detention door hardware.
- 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. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention door hardware.
- D. 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. Re-inspect after repairs or replacements are made.
 2. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- E. The Contractor shall not mount hardware in frames or install doors if opening and setting does not meet plumb, true, and square as well as finish and flush requirements for setting and operation intended.
- F. Verify locations of detention door hardware with those indicated on Shop Drawings.
- G. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified detention door hardware installation.
- H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Steel Detention Doors and Frames: Comply with ANSI/DHI A115 Series.
1. Surface-Applied Detention Door Hardware: Drill and tap detention doors and frames according to ANSI/SDI A250.6.
- B. Wood Detention Doors: Comply with DHI A115-W Series.

3.03 INSTALL

- A. Mounting Heights: Mount detention door hardware units at heights indicated in the following applicable publications unless specifically indicated or required to comply with governing regulations:
1. Steel Detention Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 2. Wood Detention Doors: DHI WDHS.3.
- 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 specified in Division 09 Sections. 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 and for sliding doors at a junction box in door frame.
- D. Security Fasteners: Install detention door hardware using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials.

3.04 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 electrified 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.

3.05 FIELD QUALITY CONTROL

- A. Detention Specialist shall 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 field tests and inspections and prepare test reports:
 - 1. After installing electrified 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. Remove and replace detention work if inspections indicate that work does not comply with specified requirements. Remove malfunctioning units, replace with new units, and retest as specified above.
- D. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.
- E. Prepare field quality-control certification that states installed products and their installation comply with requirements in the Contract Documents.

3.06 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.
 - 2. Security Door Closers: Adjust sweep period so that, from an open position of 90 degrees, detention door will take at least five seconds to move to a position of 12 degrees.

3.07 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.

3.08 DEMONSTRATION

- A. Engage a factory-authorized service representative to train the Detention Center's maintenance personnel to adjust, operate, and maintain detention door hardware and detention door hardware finishes. See Division 01 Section "Demonstration and Training."

3.09 DETENTION DOOR HARDWARE SETS

- A. General: Provide detention door hardware for each detention door to comply with requirements in this Section and detention door hardware sets indicated in Door Schedule and Architectural Drawings. Detention Door Trim as required for each set. The Contractor shall have the responsibility and the specific duty to examine all Contract Documents and furnish the proper hardware for all openings, whether scheduled or not. Contractor shall coordinate requirements with hollow metal manufacturer.

- B. Contractor shall pay special attention to each hardware set as certain sets require different locks dependent upon door assigned.

1. Hardware Set #1 (SH-1) - Typical Sliding Door for Cells

a. Qty	Hardware Item	Description
1	Southern Steel 4110LKM-1	Electromechanical Locking, Remote Door Movement, Sliding Door
1	Southern Steel 214S	Flush Pull - Interior Cell Side
1	Southern Steel 214S	Flush Pull - Dayroom Side
1	Southern Steel 1010AM-1	Food Pass/Cuff Port Lock

- b. Design Intent: Electromechanical Locking, Remote Door Movement, Sliding Door with pilaster release and electric keyswitch. Remote function unlocking from Touchscreen Control station. Mechanical opening from pilaster release, electric unlocking from electric keyswitch. Door locks in fully open and closed positing. Door Position and locking status is monitored.

2. Hardware Set #2 (SH-2) - Typical Corridor/Secure Area Entrance Sliding Door:

a. Qty	Hardware Item	Description
1	Southern Steel 3165LX.b.PKM-2	Electromechanical Locking, Electrotechnical Door Movement, Corridor Sliding Door
2	Southern Steel 212C	Grip Pull - both sides

- b. Design Intent: Electromechanical Locking, Electrotechnical Door Movement, Corridor Sliding Door Device controlled remotely from touchscreen control system. Door is unlocked locally by mogul operated keyswitch which provides electric operation. Door can be unlocked in an emergency from pilaster release locally for manual operation. Door Position and locking status is monitored.

3. Hardware Set #3 (SH-3) – Typical Secure Swing Door Inmate Area:

a. Qty	Hardware Item	Description
1	Southern Steel 120AM-1 24 VDC	Electro-mechanical Deadlatch
1	Southern Steel 214S	Flush Pull - Interior Cell Side
1	Southern Steel 214S	Flush Pull - Dayroom Side
1	Southern Steel 200 MRS	Door Position Switch
1	Strike Indicator Switch	By Lock Manufacturer
1	NW 606S	Stop
As required	Southern Steel 204FMSS	Hinges
1	Southern Steel 1010AM-1	Food Pass/Cuff Port Lock
3	Silencers	Ives SR64

- b. Design Intent: Electro-mechanical deadlatch operated (unlocked) remotely from console(s). Door is unlocked locally by mogul key which provides electric and emergency manual operation. Door position and locking status is monitored. Food Pass/Cuff Port Lock is opened from mogul key. Coordinate cuff port locks requirements with door schedule and elevations.

4. Hardware Set #4 (SH-4) - Typical Corridor/Secure Area Entrance Swing Door:

a. Qty	Hardware Item	Description
1	Southern Steel 120AM-2 24 VDC	Electro-mechanical Deadlatch
2	Southern Steel 212C	Grip Pull - both sides

1	Southern Steel 200 MRS	Door Position Switch
1	Strike Indicator Switch	By Lock Manufacturer
1	LCN Series 2210, as required	Closer
As required	NW 606S	Stop
As required	Southern Steel 204FMSS	Hinges
3	Ives SR64	Silencers
As required	Pemco 2005AV	Threshold

- b. Design Intent: Electro-mechanical deadlatch operated (unlocked) remotely from console(s). Door is unlocked locally by mogul key which provides electric and emergency manual operation. Door position and locking status is monitored.

5. Hardware Set #5 (SH-5) - Exterior Detention Swing Door:

a.	Qty	Hardware Item	Description
	1	Southern Steel 120 AE	Electro-mechanical Deadlatch
	2	Southern Steel 212C	Grip Pull - both sides
	1	Southern Steel 200 MRS	Door Position Switch
	1	Strike Indicator Switch	By Lock Manufacturer
	1	LCN Series 2210, as required	Closer
	As required	NW 606S	Stop
	As required	Southern Steel 204FMSS	Hinges
	3	Ives SR64	Silencers
	As required	Pemco 2005AV	Threshold

- b. Design Intent: Solenoid Operated Electro-mechanical deadlatch operated (unlocked) remotely from console(s). Door is unlocked locally by mogul key which provides electric and emergency manual operation. Door position and locking status is monitored.

6. Hardware Set #6 (SH-6) - Typical Access Panel/Chase:

a.	Qty	Hardware Item	Description
	1	Southern Steel 1010A	Deadlock
	1	Southern Steel Lock mount	Mounting of Mechanical Lock
	As required	By door manufacturer	Grip Pull - Corridor Side
	As required	By door manufacturer	Hinges
	As required	Ives SR64	Silencers

- b. Design Intent: Mechanical deadlock operated by mogul key. Add door position switch where required by Contract Drawings.

7. Hardware Set #7 (SH-7) – Staff Toilet:

a.	Qty	Hardware Item	Description
	1	Southern Steel 10504	Mechanical Mortise Lock
	1	LCN Series 2210, as required	Closer
	As required	Southern Steel 204FMSS	Hinges
	3	Ives SR64	Silencers

- b. Design Intent: Latchbolt operated by lever either side. Deadbolt operated by thumbturn inside, key outside. Lever inside simultaneously operates both bolts.

8. Hardware Set #8 (SH-8) – Office Doors

a.	Qty	Hardware Item	Description
	1	Southern Steel 10513	Mechanical Mortise Lock

1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
3	Ives SR64	Silencers

- b. Design Intent: Latchbolt operated by lever on either side. Deadbolt operated by thumbturn inside and key outside. Lever inside simultaneously operates both bolts.

9. Hardware Set #9 (SH-9) - Storage/Storeroom Closet, Janitors Closet

a. Qty	Hardware Item	Description
1	Southern Steel 10507	Mechanical Mortise Lock
1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
3	Ives SR64	Silencers

- b. Design Intent: Latchbolt operated by lever inside and key outside. Lever outside always rigid.

10. Hardware Set #10 (SH-10) - Equipment Room Door - Monitored

a. Qty	Hardware Item	Description
1	Southern Steel 10520	Mechanical Mortise Lock
1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
1	Folger Adam 105A	Door Position Switch
1	Ives SR64	Silencers

- b. Design Intent: Deadbolt operated by key outside and thumbturn inside. Key outside operates latchbolt and deadbolt. Lever inside simultaneously operates both bolts. Lever outside is locked with deadbolt is projected. On exterior doors add weather-stripping and threshold.

11. Hardware Set #11 (SH-11) – Inmate Toilet:

a. Qty	Hardware Item	Description
1	Southern Steel 10536	Mechanical Mortise Lock
1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
3	Ives SR64	Silencers

- b. Design Intent: Latchbolt and deadbolt operated by lever inside, key outside. Outside lever rigid.

12. Hardware Set #12 (SH-12) – Equipment/Staff Room Door – Monitored and Controlled

a. Qty	Hardware Item	Description
1	Southern Steel 10603E	Electromechanical Mortise Lock
1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
1	Southern Steel 204E	Power Transfer Hinge
1	Southern Steel 200 MRS	Door Position Switch
1	Ives SR64	Silencers

- b. Design Intent: Latchbolt operated by lever both sides except when outside lever is locked out. Key outside operates latchbolt when outside lever is locked out. Lever inside always active. Outside lever is locked, except when power is applied.

13. Hardware Set #13 (SH-13) – Inmate Area Controlled Door – Monitored and Controlled

a. Qty	Hardware Item	Description
1	Southern Steel 10601E	Electromechanical Mortise Lock
1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
1	Southern Steel 204E	Power Transfer Hinge
1	Southern Steel 200 MRS	Door Position Switch
1	Ives SR64	Silencers

- b. Design Intent: Latchbolt operated by lever both sides except when both are locked out. Key outside operates latchbolt when both levers are locked out. Both levers are locked, except when power is applied.

14. Hardware Set #14 (SH-14) – Inmate Visitation Room:

a. Hardware Item	Description
1	Southern Steel 10571
1	LCN Series 2210, as required
As required	Southern Steel 204FMSS
3	Ives SR64

- b. Design Intent: Latchbolt operated by key outside, levers always rigid.

15. Hardware Set #15 (SH-15) – Controlled Corridor Mortise Lock:

a. Qty	Hardware Item	Description
1	Southern Steel 10605E	Electromechanical Mortise Lock
1	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
1	Southern Steel 204E	Power Transfer Hinge
1	Southern Steel 200 MRS	Door Position Switch
3	Ives SR64	Silencers

- b. Design Intent: Latchbolt operated by lever both sides except when locked out. Key both sides operate latchbolt when levers are locked out. Both levers are locked, except when power is applied.

16. Hardware Set #16 (SH-16) – Double Doors Controlled

a. Qty	Hardware Item	Description
1	Southern Steel 10605E – Right Active Leaf	Electromechanical Mortise Lock
1	Southern Steel 10566	Mechanical Mortise Lock
1	Removable Mullion	By Door Manufacturer
2	LCN Series 2210, as required	Closer
As required	Southern Steel 204FMSS	Hinges
1	Southern Steel 204E	Power Transfer Hinge
2	Southern Steel 200 MRS	Door Position Switch
As required	NW 606S	Stop
6	Ives SR64	Silencers
As required	Pemco 2005AV	Threshold

- b. Design Intent: Active Leaf: latchbolt operated by lever either side except when locked out, key both sides operates latchbolt when both levers are locked out,

deadbolt actuator, both levers are locked, except when power is applied. Inactive Leaf: Levers both sides always rigid, latchbolt and deadbolt operator by key both sides. Door position switch on both leaves. Removable mullion by door manufacturer.

17. Hardware Set #17 (SH-17) – Double Doors Controlled

a.	<u>Qty</u>	<u>Hardware Item</u>	<u>Description</u>
	2	Southern Steel 10605E – Both Leafs Active	Electromechanical Mortise Lock
	1	Southern Steel 10566	Mechanical Mortise Lock
	1	Removable Mullion	By Door Manufacturer
	2	LCN Series 2210, as required	Closer
	As required	Southern Steel 204FMSS	Hinges
	2	Southern Steel 204E	Power Transfer Hinge
	2	Southern Steel 200 MRS	Door Position Switch
	As required	NW 606S	Stop
	6	Ives SR64	Silencers
	As required	Pemco 2005AV	Threshold

- b. Design Intent: Active Leafs: latchbolt operated by lever either side except when locked out, key both sides operates latchbolt when both levers are locked out, deadbolt actuator, both levers are locked, except when power is applied. Door position switch on both leaves. Removable mullion by door manufacturer.

END OF SECTION

SECTION 08 8000 GLAZING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units, for fire rated and tempered glazing.
- C. Glazing compounds and accessories.

1.03 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- C. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.
- D. Section 08 4313 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.
- E. Section 08 8853 - SECURITY GLAZING: Forced entry rated, ballistics rated, and insulated security glazing.

1.04 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- F. ASTM C1036 - Standard Specification for Flat Glass.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- L. GANA (GM) - GANA Glazing Manual.
- M. GANA (SM) - GANA Sealant Manual.
- N. GANA (LGRM) - Laminated Glazing Reference Manual.
- O. ICC (IBC) - International Building Code.
- P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use.
- Q. ITS (DIR) - Directory of Listed Products.
- R. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

- S. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.
- T. NFRC 100 - Procedure for Determining Fenestration Product U-factors.
- U. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
- V. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.
- W. UL (DIR) - Online Certifications Directory.
- X. UL 9 - Standard for Fire Tests of Window Assemblies.
- Y. UL 10B - Standard for Fire Tests of Door Assemblies.
- Z. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

1.05 ADMINISTRATIVE REQUIREMENTS

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

1.06 SUBMITTALS

- A. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Samples: Submit two samples 12 by 12 inch in size of glass units, showing coloration and design.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
 - a. North American Contractor Certification (NACC) for glazing contractors.
 - b. Equivalent independent third-party ANSI accredited certification.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.08 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

- A. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- B. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with ASCE 7.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 4. Glass thicknesses listed are minimum.
- B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 - 1. In conjunction with vapor retarder and joint sealer materials described in other sections.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.02 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 - 2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.

2.03 INSULATING GLASS UNITS

- A. Manufacturers:
 - 1. AGC Glass North America, Inc; ES 25 Pure Grey (Basis of Design): www.agcglass.com/#sle.
 - 2. Pilkington North America Inc: www.pilkington.com/na/#sle. Pilkington North America Inc: www.pilkington.com/na/#sle.
 - 3. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.

- B. Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 - 3. Metal Edge Spacers: Aluminum, bent and soldered corners.
 - 4. Spacer Color: Black.
 - 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
 - b. Color: Black.
 - 6. Purge interpane space with dry air, hermetically sealed.
- C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
 - 1. Applications: Exterior glazing unless otherwise indicated.
 - 2. Space between lites filled with argon.
 - 3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Grey.
 - b. Coating: Low-E (passive type), on #2 surface.
 - 4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - 5. Total Thickness: 1 inch.
 - 6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
 - 7. Visible Light Transmittance (VLT): 35 percent, nominal.
 - 8. Shading Coefficient: 0.29, nominal.
 - 9. Solar Heat Gain Coefficient (SHGC): 0.25, nominal.
 - 10. Visible Light Reflectance, Solar: 6 percent, nominal.
 - 11. Glazing Method: Dry glazing method, gasket glazing.
- D. Type IG-2 - Insulating Glass Units: Vision glass, double glazed.
 - 1. Applications: Exterior glazing unless otherwise indicated.
 - 2. Space between lites filled with argon.
 - 3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Grey.
 - b. Coating: Low-E (passive type), on #2 surface.
 - 4. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - 5. Total Thickness: 1 inch.
 - 6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
 - 7. Visible Light Transmittance (VLT): 35 percent, nominal.
 - 8. Shading Coefficient: 0.29, nominal.
 - 9. Solar Heat Gain Coefficient (SHGC): 0.25, nominal.
 - 10. Visible Light Reflectance, Solar: 6 percent, nominal.
 - 11. Glazing Method: Dry glazing method, gasket glazing.

2.04 GLAZING UNITS

- A. Type G-1 - Monolithic Interior Vision Glazing:
 - 1. Applications: Interior glazing unless otherwise indicated.
 - 2. Glass Type: Annealed float glass.
 - 3. Tint: Clear.
 - 4. Thickness: 1/4 inch, nominal.

- B. Type G-2 - Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve fire-doors indicated fire-rating period as indicated on drawings.
1. Applications:
 - a. Glazing in fire-rated door assembly.
 - b. Glazing in fire-rated window assembly.
 2. Glass Type: Heat reflective specialty tempered float glass.
 3. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
 4. Safety Glazing Certification: 16 CFR 1201 Category II.
 5. Glazing Method: As required for fire rating.
 6. Fire-Rating Period: As indicated on drawings.
 7. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
 - a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
 - b. "OH" - meets fire window assembly criteria including hose stream test of NFPA 257, or UL 9 fire test standards.
 - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
 - d. "XXX" - placeholder that represents fire-rating period, in minutes.
 8. Manufacturers:
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite X-45: www.safti.com/#sle.
 - b. Technical Glass Products; Fireglass20: www.fireglass.com/#sle.
 - c. Vetrotech North America; Contraflam: www.vetrotechusa.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Type G-3 - Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
 - a. Glazed lites in doors, except fire doors.
 - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
 - c. Other locations required by applicable federal, state, and local codes and regulations.
 - d. Other locations indicated on drawings.
 2. Glass Type: Fully tempered safety glass as specified.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal.
 5. Glazing Method: Dry glazing method, gasket glazing.

2.05 GLAZING COMPOUNDS

- A. Type GC-1 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; clear color.

2.06 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

- C. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- D. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Verify that sealing between joints of glass framing members has been completed effectively.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Place setting blocks at 1/4 points and install glazing pane or unit.
- C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- D. Fill gaps between glazing and stops with GC-1 type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 FIELD QUALITY CONTROL

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.07 CLEANING

- A. See Section 01 7400 - Construction Waste Management and Cleaning, for additional requirements.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove non-permanent labels immediately after glazing installation is complete.
- D. Clean glass and adjacent surfaces after sealants are fully cured.
- E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

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**SECTION 08 8853
SECURITY GLAZING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Laminated, composition "Attack Resistant" security glass, types specified and indicated on drawings.
- B. Laminated, composition "Bullet Resistant" security glass, types specified and indicated on drawings.
- C. Setting and edge blocks, spacers, glazing tapes, and sealants.
- D. Cleaners, primers, sealers, and accessories.

1.03 RELATED SECTIONS

- A. Section 05 0527 - SECURITY METAL FASTENERS for all fasteners in inmate and inmate/staff areas.
- B. Section 07 9200 - Joint Sealants for security sealant.
- C. Section 08 5653 - Security Windows for security windows and window walls requiring glazing under this section.
- D. Section 08 7163 - Detention Door Hardware.
- E. Section 08 8000 - Glazing for non-security types of glass, where indicated.

1.04 REFERENCE STANDARDS

- A. American Architectural Manufacturers' Association (AAMA): AAMA 800 - Voluntary Specification and Test Methods For Sealants.
- B. American National Standards Institute (ANSI): ANSI Z97.1 - Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM C920 - Elastomeric Joint Sealants.
 - 2. ASTM C1036 - Flat Glass.
 - 3. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT, Coated and Uncoated Glass.
 - 4. ASTM G90 - Standard Practice for Performing Accelerated Outdoor Weathering of Materials Using Concentrated Natural Sunlight.
 - 5. ASTM F1233 - Test method for Security Glazing Materials and Systems.
 - 6. ASTM F1915 - Test Method for Detention Glazing.
- D. Consumer Product Safety Commission (CPSC): CPSC 16 CFR 1201 - Safety Standards for Glazing Materials.
- E. Glass Association of North America (GANA):
 - 1. GANA - Glazing Manual.
 - 2. GANA - Sealant Manual.
- F. HP White TP-0500.02 test method for detention glazing.
- G. National Institute of Justice (NIJ): NIJ 0108.01 - Ballistic Resistant Protective Materials.
- H. Underwriters Laboratories, Inc. (UL):
 - 1. UL 752 - Bullet Resisting Glass.
 - 2. UL 972 - Burglar Resisting Glass.

- I. Walker, McGouht, Foltz and Lyeria (WMFL):
 - 1. WMFL - Security Glazing Test Standards.
 - 2. WMFL - Security Glazing Attack Standards.

1.05 SUBMITTALS

- A. Shop Drawings: Submit shop drawings clearly indicating:
 - 1. Floor plans indicating placement, type of glazing, and size of glazing for all openings.
 - 2. Descriptions of fabrication preparation, fastening methods, reinforcing, and installation.
- B. Product Data: Submit manufacturer's descriptive literature and technical data including:
 - 1. Instructions for handling, storing, installation, and recommended procedures for cleaning of each type of glass and glazing materials.
 - 2. Glass and Plastics: Provide structural, physical and environmental characteristics, and size limitations of each type of glass/plastic product.
 - 3. Compounds/Sealant: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, identify available colors.
- C. Samples: Submit to job site, prior to delivery of materials, samples of each of the following:
 - 1. One 12-inch by 12-inch piece of each type of glass, in required thickness.
 - 2. One bead, approximately 1/4-inch wide by 3 inches long, of each sealant employed, indicating color of set or cured material.
 - 3. Certificate of Compliance: Documentation of compliance with specification requirements.
- D. Certificate of Compatibility: Documentation of compatibility of sealant with glazing products.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the manufacture of security glass, types as specified, with minimum documented five years experience.
- B. Installer Qualifications: A qualified installer who employs glazing installers for this Project who are certified under the National Glass Association Glazier Certification Program, approved by the glazing manufacturer and have a minimum documented five years experience.
- C. Test documents shall be wholly owned and in the name of the approved manufacturer, no round robin or co-owned test results are acceptable.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Deliver all lights of glass with manufacturer's permanent trademark, and a removable product labels intact.
 - a. Product Labels: Provide product labels for each type of proposed glass unit to be installed indicating:
 - 1) Manufacturer's product name and number.
 - 2) Type of unit in accordance with the drawings and specifications.
 - 3) Thickness and size of glass sheet.
 - 2. Deliver glazing components and sealants in manufacturer's unopened, undamaged and in labeled containers.
- B. Storage and Handling:
 - 1. Store glass in designated area, away from traffic and construction, in original packaging until placement of glazing is to occur.
 - a. Support glass lights vertically on supports capable of holding the glass weight in a manner which applies pressure distribution on the glass units.
 - b. Store all glass at a 5 to 7 degree angle on blocking.
 - 2. Storage conditions shall protect glazing materials from:

- a. Weather, including, UV and infrared exposure humidity, rain, and other damaging moisture exposure.
- b. Adverse temperatures.
- c. Scratching, marring, chipping, crackage, breakage and warpage.
- 3. Do not remove labels until glass has been installed.
- 4. Keep glass free from contamination by materials capable of staining or damaging glass.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Perform glazing only when ambient temperature is above 40 degrees F.
- B. When circumstances require glazing below 45 degrees F, steps shall be taken to assure dry and frost-free surface, as approved by the Architect.

1.09 WARRANTY

- A. Provide manufacturer's written warranty for a period of not less than five years, under provisions of closeout section.
- B. Warranty: Provide a published and written warranty signed by manufacturer agreeing to furnish F.O.B. point of manufacture, freight allowed to project site, within 45 working days after receipt of notice from Owner for replacement of those units which develop manufacturing defects.
- C. Definitions: Manufacturing defects are defined as edge separation, seal failure, delamination, core cracking, loss of visibility/clarity due to dusting or misting, or UV exposure, or chemical reaction to glass cleaners.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Available 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. Global Security Glazing (Basis of Design), Selma, AL.
 - 2. LTI Smart Glass, Inc., Pittsfield, MA.
 - 3. North American Specialty Glass (NASG), Trumbauersville, PA.
 - 4. Old Castle Glass, Telford, PA.
 - 5. SAF-GLAS, LLC, Riviera Beach, FL.
 - 6. Substitutions: See Section 01 1600 - Product Requirements.
- B. Glazing Materials:
 - 1. Tremco, Cleveland, Ohio.
 - 2. Pecora Corporation, Harleysville, PA.
 - 3. Substitutions: See Section 01 1600 - Product Requirements.

2.02 LAMINATED COMPOSITION SECURITY GLASS - ATTACK RESISTING TYPES

- A. General: All laminated composition attack resisting security glass units, whether specifically shown or specified, shall conform to manufacturer's standards as to maximum size for each type of glass.
- B. Type A Forced Entry Security Glass: 0.5625 inch nominal, 1/8 inch Clear Heat Strengthened, 60 .050 inch urethane, 1/4 inch Polycarbonate, .050 inch urethane, 1/8 inch Clear Heat Strengthened. Global Security Glazing Secur-Tem+Poly 2117 (basis of design) or pre-bid approved equal.
 - 1. Product shall meet one of the following:
 - a. ASTM F1915 Test Procedure: Security Grade 4 (10) Minute Containment.
 - b. Forced Entry: H.P. White Level 1-T.P. 0500.02 Test Procedure.
- C. Type B Fire-Rated Forced Entry Security Glass: 1-5/8 inch nominal, clear, 45 minute fire-rated and ASTM F1915 Security Grade 4 (10 min) Global Security Glazing Inferno-Lite ULTIIMAX

45-2117G or INFERNOGARD 45-2117 (basis of design) or pre-bid approved equal. Note: Install per UL as tested conditions, material must not be allowed to freeze at any time. No wire.

1. Product shall meet one of the following:
 - a. ASTM F1915 Test Procedure: Security Grade 4 (10) Minute Containment.
 - b. Forced Entry: H.P. White Level 1-T.P. 0500.03 Test Procedure.
 2. Ballistic Resistance:
 - a. H.P. White Levels A-TP-0500.02. (Spall with no penetration)
 - b. .38 Special handgun, 3 shots in an 8 inch Circle, 158 grain lead, 20 feet.
- D. Type C Force Entry Security Glass: 0.75 inch nominal, clear, glass clad polycarbonate, 1/8 inch Clear Heat Strengthened, 0.050 inch urethane, 1/4 inch polycarbonate, .025 inch urethane, 1/8 inch polycarbonate, 0.050 inch urethane, 1/8 inch clear heat strengthened, ASTM F-1915 Security Grade 2, Global Security Glazing SecurTem+Poly SP-019 (basis of design) or pre-bid approved equal.
1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 2 (40) Minute Containment.
 - b. Forced Entry: H.P. White Level 1-T.P. 0500.03 Test Procedure.
 - c. WMFL Level III.
 2. Ballistic Resistance:
 - a. H.P. White Levels A and B-TP-0500.02. (Spall with no penetration)
 - b. .38 Special handgun, 3 shots in an 8 inch Circle, 158 grain lead, 20 feet.
 - c. 9mm handgun, 124 grain lead, FMJ caliber, 25 feet.
- E. Type D Fire-Rated Forced Entry Security Glass: 1-13/16 inch nominal, clear, Global Security Glazing Inferno-Lite ULTIMAX 45-SP019G or INFERNOGARD 45-SP019 (basis of design) or pre-bid approved equal. Note: Install per UL as tested conditions, material must not be allowed to freeze at any time. No wire.
1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 2 (40) Minute Containment.
 - b. Forced Entry: H.P. White Level 1-T.P. 0500.03 Test Procedure.
 - c. WMFL Level III (30 Minute Physical Attack).
 2. Ballistics Resistance:
 - a. H.P. White Levels A and B-TP-0500.02. (Spall with no penetration)
 - b. .38 Special handgun, 3 shots 8 inch circle, 158 grain lead, 20 feet.
 - c. 9mm handgun, 124 grain lead, FMJ caliber, 25 feet.
 3. Fire Resistance:
 - a. 45 minute fire rating, UL 9, UL 10B, UL 10C, UL 263, NFPA 80, NFPA 252, NFPA 257, ASTM E119 .
 - b. Underwriter's Laboratories, Inc File #R14515, #R22066.
 - c. Intertek Certification, Spec ID 56532 & 56596.
- F. Type E Forced Entry Fire-Rated Glass: 2.2 inch nominal, clear, Global Security Glazing Inferno-Lite ULTIMAX® 90-SP019G or INFERNOGARD™ 90-SP019 (basis of design) or pre-bid approved equal. Note: Install per UL as tested conditions, material must not be allowed to freeze at any time. No wire.
1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 2 (40) Minute Containment.
 - b. Forced Entry: H.P. White Level 3 T.P. 0500.03 Test Procedure.
 - c. WMFL Level III (30 Minute Physical Attack).
 2. Ballistic Resistance:
 - a. .38 Special handgun, 3 shots in an 8 inch Circle, 158 grain lead, 20 feet.
 - b. 9mm handgun, 124 grain lead, FMJ caliber, 25 feet. (Spall with no penetration.)
 3. Fire Resistance:

- a. 90 minute fire rating, UL 9, UL 10B, UL 10C, UL 263, NFPA 80, NFPA 252, NFPA 257, ASTM E119.
 - b. Underwriter's Laboratories, Inc File #R14515, #R22066.
 - c. Intertek Certification, Spec ID 56532 & 56596.
- G. Type F Tinted Insulated Forced Entry Security Glass: 1-3/4 inch nominal, 1/4 inch Vitro Solarban 60, tint color [____], Tempered (Low E on #2 surface), 1/2 inch Airspace, 1 inch Clear Secur-Tem + Poly- SP028, Global Security Glazing SB60VT (Clear) Temp IG - Secur-Tem + Poly® (basis of design) or approved equal.
 - 1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 1 (60) Minute Containmentment.
 - b. Forced Entry: H.P. White Level IV-T.P. 0500.03 Test Procedure.
 - c. WMFL Level II (60 Minute Physical Attack).
 - 2. Ballistics Resistance:
 - a. H.P. White Levels B-TP-0500.02. (Spall with no penetration)
 - b. .9mm handgun, 3 shots in an 8 inch circle, 158 grain lead, 20 feet
- H. Type G Fire-Rated, Reflective, Forced Entry Security Glass: 2.15 inch nominal, Global Security Glazing MIRROPANE Inferno-Lite ULTIMAX® 60-SP028G or INFERNOGARD™ 60-SP028 (basis of design) or pre-bid approved equal. Note: Install per UL as tested conditions, material must not be allowed to freeze at any time. No wire.
 - 1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 2. (40) Minute Containmentment.
 - b. Foreced Entry: H.P. White Level 1-T.P. 0500.03 Test Procedure.
 - c. WMFL Level II (60 Minute Physical Attack).
 - 2. Ballistic Resistance:
 - a. H.P. White Levels B-TP-0500.02. (Spall with no penetration)
 - b. 9mm handgun, 3 shots in an 8 inch Circle, 158 grain lead, 20 feet.
 - 3. Fire Resistance:
 - a. 60 minute fire rating, UL 9, UL 10B, UL 10C, UL 263, NFPA 80, NFPA 252, NFPA 257, ASTM E119.
 - b. Underwriter's Laboratories, Inc File #R14515, #R22066.
 - c. Intertek Certification, Spec ID 56532 & 56596.
- I. Type H Forced Entry Security Glass: 1 inch nominal, clear, glass clad polycarbonate, 1/8 inch Clear Heat Strengthened, .050 inch urethane, 1/4 inch polycarbonate, .025 inch urethane, 3/8 inch polycarbonate, .050 inch urethane, 1/8 inch clear heat strengthened. Global Security Glazing Secur-Tem+Poly SP-028 (basis of design) or pre-bid approved equal.
 - 1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 1 (60) Minute Containmentment.
 - b. Forced Entry: H.P. White Level IV-T.P. 0500.03 Test Procedure.
 - c. WMFL Level II (60 Minute Physical Attack).
 - 2. Ballistics Resistance:
 - a. H.P. White Levels B-TP-0500.02. (Spall with no penetration)
 - b. .9mm handgun, 3 shots in an 8 inch circle, 158 grain lead, 20 feet.

2.03 LAMINATED COMPOSITION SECURITY GLASS - BULLET RESISTIVE TYPES

- A. General: All laminated composition bullet resistant security glass units, whether specifically shown or specified, shall conform to manufacturer's standards as to maximum size for each type of glass.
- B. Type J Bullet Resistant Insulated Security Glass: 2 inch nominal, 1/4 inch Vitro Solarban 60, tint color [____], Tempered (Low E on #2 surface), 1/2 inch Airspace, 1-3/16 inch Clear Secur-Tem + Poly- UL Level IV SP412, Global Security Glazing SB60VT (Clear) Temp IG UL Level 4

- Secur-Tem + Poly® (basis of design) or approved equal.
- 1. Ballistic Resistance:
 - a. UL 752 – Level 4 – UL Listed – File BP844.
 - b. .30 Caliber Rifle Lead Core Soft Point (.30-06 Caliber), No Spall, No Penetration.
- C. Type K Insulated Forced Entry Security Glass: 1-3/4 inch nominal, 1/4 inch Vitro Solarban 60, Clear, Tempered (Low E on #2 surface), 1/2 inch Airspace, 1 inch Clear Secur-Tem + Poly-SP028, Global Security Glazing SB60VT (Clear) Temp IG - Secur-Tem + Poly® (basis of design) or approved equal.
 - 1. Forced Entry Resistance:
 - a. ASTM F1915 Test Procedure: Security Grade 1 (60) Minute Containment.
 - b. Forced Entry: H.P. White Level IV-T.P. 0500.03 Test Procedure.
 - c. WMFL Level II (60 Minute Physical Attack).
 - 2. Ballistics Resistance:
 - a. H.P. White Levels B-TP-0500.02. (Spall with no penetration)
 - b. 9mm handgun, 3 shots in an 8 inch circle, 158 grain lead, 20 feet.

2.04 DESCRIPTION/FABRICATION

- A. Chemically Strengthened Glass: Shall have a Modulus of Rupture range from 16,000 to 31,000 psi.
- B. Laminated Composition Sheet Security Products:
 - 1. Glass: Refer to primary and chemically-strengthened glass requirements as related to properties of coated and uncoated glasses making up laminated composition security glass.
 - 2. Interlayer: Provide glass manufacturer's standard interlayer for laminating panes of glass with an ionomer core or with a polycarbonate core, with a proven record of showing no tendency to bubble, discolor, or loose physical or mechanical properties after laminating and installation.
 - 3. Plastic Core/Layers: Refer to appropriate product requirements relating to properties of "Ionomer" or "Polycarbonate" making up laminated composition security products.
 - 4. Laminating Process: Fabricate laminated sheets using laminator's standard process to produce units free from foreign substances and air bubbles.

2.05 GLAZING MATERIALS

- A. Compatibility: Select materials with proven record of compatibility with surfaces contacted in each application.
- B. Sealant:
 - 1. Interior Glazing: Provide a single component high performance one-part chemically curing silicone sealant, conforming to ASTM C920, Type S, NS, Class 25, and FED TT-S-00230C, TREMCO "Spectrem 2", GE "SCS1200 Construction Sealant" or DOW "995 Silicone Structural Adhesive" in non-inmate and non-staff inmate areas. Provide security sealant in inmate and non-staff inmate areas.
 - 2. Exterior Glazing: Provide a single component acrylic terpolymer, FED TT-S-00230C; "TREMCO MONO 555", or equal as approved by Architect, color as later selected by Architect.
- C. Glazing Tape: Preformed butyl, AAMA 800, with integral resilient tube spacing device; 10 - 15 Shore A hardness; coiled on release paper; color as later selected by Architect.
- D. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 70 - 90 Shore A durometer hardness, 4 inch long by 3/8 inch high.
- E. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealants; 40 - 50 Shore A durometer hardness; of size and shape recommended by glass and sealant manufacturers for each application.

- F. Edge Blocks: Neoprene blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- G. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer for each application.

PART 3 EXECUTION

3.01 INSPECTION

- A. Check that glazing channels are free of burrs, irregularities, and debris.
- B. Check that glass is free of edge damage or face imperfections.
- C. Do not proceed with installation until any unsatisfactory conditions are corrected and placed in satisfactory condition.

3.02 PREPARATION

- A. Field Measurements:
 - 1. Cut glass accurately to sizes obtained from verified field measurements of frames to receive glass.
 - 2. Allow for proper edge clearances.
- B. Preparation of Surfaces:
 - 1. Remove any protective coatings or covering from surfaces to be glazed.
 - 2. Clean glass and glazing surfaces to remove dust, oil and contaminants, and wipe dry.

3.03 INSTALLATION

- A. General Requirements: All materials shall be used in accordance with the manufacturer's printed instructions and recommended procedures.
- B. Positioning of Glass:
 - 1. Orient pattern, and draw of glass pieces in same direction.
 - 2. Place glass waves parallel to floor.
- C. Clearance Requirements: Allow the following minimum nominal clearances, in accordance with glass manufacturer's recommendations; glass face to channel face, glass edge to frame member, and glass bite:

1. <u>Face Clearance</u>	<u>Edge Clearance</u>	<u>Bite</u>
1/8 inch	1/4 inch	1 inch

3.04 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to proper lengths PRIOR to application, install against permanent stop, 3/16 to 1/4 inch below sightline.
- B. Do not lap the adjoining lengths of tape or rubber shim, as this will prevent full contact around perimeter of glass:
 - 1. Strips must be installed in four separate sections, not run continuously around corners.
- C. Place setting blocks at 1/4 points.
- D. Rest glass on setting blocks and press against tape with sufficient pressure to ensure full contact and adhesion at perimeter.
- E. Install removable stops; insert continuous spacer strips between glass and applied stop to keep glass in compression against the tape.
 - 1. Install in four separate sections.
- F. Sealant cavity pocket, formed by setting of the applied stop, shall then be filled to the sight line with sealant.
- G. Cap bead shall not exceed 1/16-inch above sight line onto glass surface.

H. Tool or wipe cap bead with solvent for smooth appearance.

3.05 INTERIOR WET METHOD (SEALANT AND SEALANT)

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims on both sides at 24-inch intervals, 1/4-inch below sight line.
- C. Fill void between glazing and stops with specified type sealant to depth of bite on glazing, but not more than 3/8-inch below sight line to ensure full contact with glazing and continued air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 CLEANING AND PROTECTION

- A. Cleaning:
 - 1. Remove excess glazing material from installed glass.
 - 2. Remove labels from surfaces as soon as installed.
 - 3. Remove debris from work site.
- B. Protection:
 - 1. Attach crossed streamers away from glass face.
 - 2. Do not apply markers to glass surface.
 - 3. Replace damaged glass.

END OF SECTION

**SECTION 09 0561
COMMON WORK RESULTS FOR FLOORING PREPARATION**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
 - 1. Resilient tile and sheet.
 - 2. Thin-set ceramic tile and stone tile.
 - 3. Fluid-applied flooring.
- B. Preparation of new concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and alkalinity (pH).
- D. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
 - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- E. Patching compound.
- F. Remedial floor coatings.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.
- B. Section 03 3000 - Cast-in-Place Concrete: Concrete admixture for slabs to receive adhered flooring, to prevent moisture content-related flooring failures.
- C. Section 03 3000 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.

1.04 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.06 SUBMITTALS

- A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and alkalinity (pH) limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- B. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 - 1. Manufacturer's statement of compatibility with types of flooring applied over remedial product.
 - 2. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
 - 3. Manufacturer's installation instructions.
- C. Testing Agency's Report:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and alkalinity (pH) test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.
 - 6. Product data for recommended remedial coating.
 - 7. Include certification of accuracy by authorized official of testing agency.
 - 8. Submit report to Architect.
 - 9. Submit report not more than two business days after conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.
- E. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.
- F. Copy of RFCI (RWP).

1.07 QUALITY ASSURANCE

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
 - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
 - 1. Provide access for and cooperate with testing agency.
 - 2. Confirm date of start of testing at least 10 days prior to actual start.
 - 3. Allow at least 4 business days on site for testing agency activities.
 - 4. Achieve and maintain specified ambient conditions.
 - 5. Notify Architect when specified ambient conditions have been achieved and when testing will start.
- D. Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.
- E. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

1.09 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
 - 4. Products:
 - a. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat: www.tecspecialty.com/#sle.
 - b. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch: www.usg.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
 - 1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
 - 2. Use product recommended by testing agency.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

- A. Follow recommendations of testing agency.
- B. Perform following operations in the order indicated:
 - 1. Preliminary cleaning.
 - 2. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.

3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 4. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 5. Specified remediation, if required.
 6. Patching, smoothing, and leveling, as required.
 7. Other preparation specified.
 8. Adhesive bond and compatibility test.
 9. Protection.
- C. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
 3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.03 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.04 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.

- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

3.05 ALKALINITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
 - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
 - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.06 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with recommendations of testing agency.
- C. Comply with requirements and recommendations of floor covering manufacturer.
- D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- E. Do not fill expansion joints, isolation joints, or other moving joints.

3.07 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.08 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

3.09 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

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**SECTION 09 2116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Gypsum sheathing.
- F. Gypsum wallboard.
- G. Joint treatment and accessories.

1.03 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Structural steel stud framing.
- B. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
- D. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- E. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.04 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- C. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- H. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.
- I. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- J. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
- K. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.

- L. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
- M. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.
- N. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels.
- O. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- P. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- Q. ASTM E413 - Classification for Rating Sound Insulation.
- R. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- S. GA-216 - Application and Finishing of Gypsum Panel Products.

1.05 SUBMITTALS

- A. Shop Drawings: Indicate special details associated with fireproofing.
- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.
- E. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing.
- B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
 - 1. Fire-Resistance-Rated Partitions: Hourly rating and design as indicated on the drawings.
 - 2. Head of Fire-Resistance-Rated Partitions: Design as indicated on the drawings; 1 hour rating.

2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 2. Marino: www.marinoware.com/#sle.
 - 3. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.

4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/360 at 7.5 psf.
 1. Studs: C-shaped with knurled or embossed faces.
 2. Runners: U shaped, sized to match studs.
 3. Ceiling Channels: C-shaped.
 4. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
- C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
- D. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
 1. Products:
 - a. ClarkDietrich; BlazeFrame Firestop Deflection Track: www.clarkdietrich.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Non-structural Framing Accessories:
 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 2. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 1. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 2. National Gypsum Company: www.nationalgypsum.com/#sle.
 3. USG Corporation: www.usg.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 5. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: www.gpgypsum.com/#sle.
 - c. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel: www.nationalgypsum.com/#sle.
 - d. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. Impact Resistant Wallboard:
 1. Application: High-traffic areas indicated.
 2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.

3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
 4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 5. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
 6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 7. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
 8. Type: Fire-resistance-rated Type X, UL or WH listed.
 9. Thickness: 5/8 inch.
 10. Edges: Tapered.
 11. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus Impact-Resistant: www.gpgypsum.com/#sle.
 - b. National Gypsum Company; Gold Bond eXP Interior Extreme IR Gypsum Panel: www.nationalgypsum.com/#sle.
 - c. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X: www.usg.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Backing Board For Wet Areas:
1. Application: Surfaces behind tile in wet areas including spaces behind toilet fixtures and where ceramic tile is indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
 - b. Products:
 - 1) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
 - 2) National Gypsum Company; Gold Bond eXP Tile Backer: www.nationalgypsum.com/#sle.
 - 3) USG Corporation; Durock™ Brand Glass-Mat Tile Backerboard.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- E. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 4. Type X Thickness: 5/8 inch.
 5. Edges: Tapered.
 6. Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com/#sle.
 - c. USG Corporation; Durock™ Brand Glass-Mat Tile Backerboard.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- F. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
 2. Thickness: 5/8 inch.
 3. Edges: Tapered.

4. Products:
 - a. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board: www.gpgypsum.com/#sle.
 - b. USG Corporation; Sheetrock® Brand UltraLight Panels Mold Tough.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- G. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
 1. Application: Exterior sheathing, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 5. Core Type: Regular.
 6. Regular Board Thickness: 5/8 inch.
 7. Edges: Square.
 8. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
 - b. National Gypsum Company; Gold Bond eXP Sheathing: www.nationalgypsum.com/#sle.
 - c. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing: www.usg.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 1/2 inch.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
 1. Products:
 - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
 - b. Liquid Nails, a brand of PPG Architectural Coatings; Drywall Adhesive: www.liquidnails.com/#sle.
 - c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stfirestop.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Water-Resistive Barrier: As specified in Section 07 2500.
- D. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 1. Corner Beads: Low profile, for 90 degree outside corners.
 - a. Products:
 - 1) ClarkDietrich; Strait-Flex Big-Stick: www.clarkdietrich.com/#sle.
 - 2) Phillips Manufacturing Co; Everlast Corner Bead: www.phillipsmfg.com/#sle.
 - 3) Substitutions: See Section 01 6000 - Product Requirements.
 2. Expansion Joints:
 - a. Type: V-shaped metal with factory-installed protective tape.
- E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 2. Joint Compound: Drying type, vinyl-based, ready-mixed.

- F. Finishing Compound: Surface coat and primer, takes the place of skim coating.
- G. Abuse Resistant Finishes:
 - 1. Acrylic, water-based, non-textured, high build, tintable primer and surfacer.
- H. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Laterally brace entire suspension system.
 - 3. Secure expanded metal mesh specified in Section 10 2213 to ceiling framing with wire ties where indicated on the drawings.
- C. Studs: Space studs as indicated.
 - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
 - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Blocking: Install wood blocking for support of:
 - 1. Wall-mounted cabinets.
 - 2. Plumbing fixtures.
 - 3. Toilet partitions.
 - 4. Toilet accessories.
 - 5. Wall-mounted door hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.04 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

- E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing horizontally, with edges butted tight and ends occurring over firm bearing.
 - 1. Seal joints, cut edges, and holes with water-resistant sealant.
- F. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 3. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

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**SECTION 09 2513
ACRYLIC PLASTER FINISH**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Provide textured finish system for exterior gypsum board soffit and ceiling surfaces.
 - 1. Provide where Exterior Soffit Finish System is indicated on the drawings.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Material Safety Data Sheets.
- B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples for Initial Selection: For each type of factory-prepared finish coat indicated.

1.04 REFERENCES

- A. South Coast Air Quality Management District (SCAQMD) - Rule 1113, Architectural Coatings.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: The textured finish system manufacturer shall be a company with at least thirty five years of experience in manufacturing specialty finishes and regularly engaged in the manufacture and marketing of products specified herein. The manufacturer shall have an ISO 9001:2008 certified quality system and ISO 14001:2004 certified environmental management system.
- B. Installer's Qualifications: The contractor shall be qualified to perform the work specified by reason of experience. Contractor shall have at least 5 years of experience in commercial textured finish application, and shall have completed at least 3 projects of similar size and complexity. Contractor shall provide proof before commencement of work that he/she will maintain and supervise a qualified crew of applicators through the duration of the work. When requested Contractor shall provide a list of the last three comparable jobs including the name, location, and start and finish dates for the work.
- C. Mock-ups: The contractor shall install a mock-up of the system for evaluation and approval by the design professional, building owner, or owner's representative/quality assurance agent.
- D. Testing: Testing shall be conducted as directed by the design professional, building owner, or owner's representative/quality assurance agent to verify soffit/ceiling assembly performance and adhesion to prepared substrates.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in original packaging, labeled with product identification, manufacturer, and batch number.
- B. Store products in a dry area with temperature maintained between 50 and 85 degrees F (10 and 29 degrees C). Protect from direct sunlight. Protect from freezing. Protect from extreme heat (>90 degrees F [32 degrees C]).
- C. Handle products in accordance with manufacturer's printed instructions.

1.07 WARRANTY

- A. Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design: The design for exterior soffit finish system is based on Sto Corporation. Subject to compliance with requirements provide the named product or a comparable product by one of the following:
 - 1. Dryvit Systems, Inc.
 - 2. Stuc-O-Flex International, Inc.
 - 3. Substitutions: See Division 01 section for product requirements.

2.02 MATERIALS

- A. Textured Finishes
 - 1. Stolit – high performance decorative and protective acrylic-based textured wall finish with integral color, complies with SCAQMD Rule 1113 for architectural finishes.
- B. Primer
 - 1. Sto Primer – acrylic-based sanded primer, complies with SCAQMD Rule 1113 for primers.
- C. Base Coat:
 - 1. Sto BTS Plus – one component polymer modified portland cement high build base coat.
- D. Surface Reinforcement:
 - 1. Sto Mesh – nominal 4.5 oz/yd² (153 g/m²) glass fiber reinforcing mesh treated for compatibility with Sto materials
- E. Gypsum Soffit Board:
 - 1. DensGlass® glass mat faced gypsum sheathing in compliance with ASTM C 1177.
- F. Soffit Vents:
 - 1. Basis-of-Design: The design for soffit vents is based on Model 3549-50 as manufactured by Plastic Components, Inc. Provide the named product or a comparable product.

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

3.03 INSTALLATION

- A. Soffit Installation: Gypsum soffit board must be installed in conformance with the applicable building code and manufacturer's written installation instructions. Gypsum soffit board surface must be clean, dry, and free of surface contamination. Gypsum soffit board surface shall not have planar irregularities in excess of 1/16 inch (1.6 mm) and shall be free of voids, cracks, and other surface defects.
- B. Mixing
 - 1. Mix Sto products in accordance with published literature. Refer to applicable Product Bulletins for specific information on use, handling, application, precautions, and limitations of specific products.
- C. Application

1. Install corrosion proof termination accessories with perforated flanges for keying of the base coat at junctures with penetrations such as soffit vents, electrical fixtures, and with abutting walls and columns. Install corrosion proof control joints with perforated flanges for keying of the base coat at intervals as required by the gypsum soffit board manufacturer. Refer to Sto Guide details.
2. Install nominal 1/8 inch (3 mm) base coat by trowel to the soffit/ceiling board surface. Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-½ inches (64 mm) at mesh seams and feather at seams. Double wrap all inside and outside corners with minimum 8-inch (203 mm) overlap in each direction (except where corner bead is used at outside corners lap mesh over perforated flange of accessory). Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible. Overlap perforated flanges of accessories with the base coat/reinforcing mesh application. Do not install base coat and mesh onto solid (unperforated) portions of accessories.
3. When the base coat application is dry apply the primer by brush or roller to the entire base coat surface.
4. When the primer application is dry apply the textured finish by trowel. Apply finish in a continuous application, and work to a wet edge. Float the finish to achieve the desired texture.

3.04 CLEANING

- A. Clean adjacent surfaces and remove excess material, droppings, and debris.

3.05 REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.06 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them during and after construction.
- B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.
- C. Seal penetrations through the finished surface with backer rod and sealant or other appropriate means.

END OF SECTION

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SECTION 09 3000 TILING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Ceramic trim.
- D. Non-ceramic trim.

1.03 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 0561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- C. Section 09 2116 - Gypsum Board Assemblies: Tile backer board.

1.04 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar.
- C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.
- D. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement.
- E. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship.
- F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive.
- G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
- H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy.
- I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout.
- J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
- K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
- L. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar.

- M. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
- N. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar.
- O. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
- P. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar.
- Q. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation.
- R. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
- S. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.
- T. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products .
- U. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.
- C. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.
- F. Installer's Qualification Statement:
 - 1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.
- G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Tile: 1 percent of each size, color, and surface finish combination.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.
 - a. Accredited Five-Star member of the National Tile Contractors Association (NTCA).

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

PART 2 PRODUCTS

2.01 TILE

- A. Ceramic Mosaic Tile, Type CT-1 / CTB: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 3 by 3 inch, nominal.
 - 3. Shape: Square.
 - 4. Edges: Cushioned.
 - 5. Surface Finish: Unglazed.
 - 6. Color(s): To be selected by Architect from manufacturer's groups 1, 2 and 3.
 - 7. Trim Units: Matching bead, surface bullnose, and cove base shapes in sizes coordinated with field tile.
 - 8. Products:
 - a. Crossville, Inc.; Color Blox® Mosaics (Basis of Design): www.crossvilleinc.com.
- B. Glazed Wall Tile, Type CT-2: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
 - 2. Size: 3 x 12, 6 x 6, 3 x 6, 4 x 8, nominal.
 - 3. Edges: Manufacturer's standard.
 - 4. Surface Finish: As indicated on the drawings.
 - 5. Color(s): To be selected by Architect from manufacturer's full range.
 - 6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
 - 7. Products:
 - a. Crossville Inc; Swatches (Bais of Design): www.crossvilleinc.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Quarry Tile, Type QT / QTB: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: Over 3.0 but not more than 5.0 percent as tested in accordance with ASTM C373.
 - 2. Size: 8 by 8 inch, nominal.
 - 3. Thickness: 1/2 inch, nominal.
 - 4. Edges: Square.
 - 5. Surface Finish: Non-slip.
 - 6. Color(s): To be selected by Architect from manufacturer's standard range.
 - 7. Trim Units: Matching cove base and inside/outside corner shapes in sizes coordinated with field tile.
 - a. Height: 6 inches.
 - 8. Products:
 - a. Metropolitan Ceramics; QuarryBasics XA Abrasive (Basis of Design): www.metroceramics.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
 - 1. Applications:
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Jointed.

- c. Floor to Wall Joints: Cove base.
- 2. Manufacturers: Same as for tile.
- B. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
 - 1. Applications:
 - a. Open edges of floor tile.
 - b. Transition between floor finishes of different heights.
 - c. Thresholds at door openings.
 - 2. Manufacturers:
 - a. Schluter-Systems: www.schluter.com/#sle.
 - b. Genesis APS International: www.genesis-aps.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 - 1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
 - 2. Products:
 - a. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com/#sle.
 - b. Custom Building Products; Porcelain Tile Professional Thin-Set Mortar: www.custombuildingproducts.com/#sle.
 - c. LATICRETE International, Inc; 257 TITANIUM: www.laticrete.com/#sle.
 - d. Merkrete, by Parex USA, Inc; Merkrete 735 Premium Flex: www.merkrete.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): As selected by Architect from manufacturer's full line.
 - 4. Products:
 - a. ARDEX Engineered Cements; ARDEX FL: www.ardexamericas.com/#sle.
 - b. Custom Building Products; Prism Color Consistent Grout: www.custombuildingproducts.com/#sle.
 - c. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
 - 1. Applications: Where indicated.

2.05 MAINTENANCE MATERIALS

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
 - 1. Applications: Between tile and plumbing fixtures.
 - 2. Color(s): As selected by Architect from manufacturer's full line.
 - 3. Products:
 - a. ARDEX Engineered Cements; ARDEX SX: www.ardexamericas.com/#sle.

- b. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.
 - c. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
 - 1. Composition: Water-based colorless silicone.
 - 2. Products:
 - a. Merkrete, by Parex USA, Inc; Merkrete Grout Sealer: www.merkrete.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.06 ACCESSORY MATERIALS

- A. Underlayment at Floors: Specifically designed for bonding to thin-set setting mortar; not primarily a waterproofing material and having the following characteristics:
 - 1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
 - 2. Type: Thin-Set Mortar Adhered Sheet.
 - a. Products:
 - 1) ARDEX Engineered Cements; ARDEX UI 740 Flexbone: www.ardexamericas.com/#sle.
 - 2) Custom Building Products; EasyMat Tile & Stone Underlayment: www.custombuildingproducts.com/#sle.
 - 3) LATICRETE International, Inc; LATICRETE STRATA MAT: www.laticrete.com/#sle.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561.
 - 2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

3.05 INSTALLATION - WALL TILE

- A. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.
- B. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.06 CLEANING

- A. Clean tile and grout surfaces.

3.07 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

**SECTION 09 5100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.03 RELATED REQUIREMENTS

- A. Section 05 3100 - Steel Decking: Placement of special anchors or inserts for suspension system.
- B. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
- C. Section 23 3700 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- D. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.
- E. Section 28 2000 - Video Surveillance: Cameras in ceiling system.
- F. Section 28 3116 - Addressable Fire Alarm System: Fire alarm components in ceiling system.

1.04 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- D. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- E. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- F. 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.
- G. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.06 SUBMITTALS

- A. Shop Drawings: Indicate grid layout and related dimensioning.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two full size samples illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's Qualification Statement.

1.07 QUALITY ASSURANCE

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

1.08 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. Armstrong World Industries, Inc; (Basis of Design): www.armstrongceilings.com/#sle.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.
 - 3. USG Corporation: www.usg.com/ceilings/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels, Type ACT-1: Painted mineral fiber, with the following characteristics:
 - 1. Application(s): Spaces as indicated on the drawings.
 - 2. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - b. Pattern: C E.
 - 3. Size: 24 by 48 inch.
 - 4. Thickness: 7/8 inches.
 - 5. Light Reflectance: 0.85 percent, determined in accordance with ASTM E1264.
 - 6. NRC Range: 0.55 to 0.60, determined in accordance with ASTM E1264.
 - 7. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 - 8. Panel Edge: Square.
 - 9. Color: White.
 - 10. Suspension System Type 1: Exposed grid.
 - 11. Products:
 - a. Armstrong World Industries, Inc; Fine Fissured High NRC: www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Acoustical Panels, Type ACT-2: Painted mineral fiber, with the following characteristics:
 - 1. Application(s): Spaces as indicated on the drawings.
 - 2. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - b. Pattern: C E.
 - 3. Size: 24 by 24 inches.
 - 4. Thickness: 7/8 inches.
 - 5. Light Reflectance: 0.85 percent, determined in accordance with ASTM E1264.
 - 6. NRC Range: 0.55 to 0.60, determined in accordance with ASTM E1264.
 - 7. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 - 8. Panel Edge: Square.

9. Color: White.
 10. Suspension System Type 1: Exposed grid.
 11. Products:
 - a. Armstrong World Industries, Inc; Fine Fissured High NRC:
www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Acoustical Panels, Type ACT-3: Mineral fiber with membrane-faced overlay, with the following characteristics:
1. Application(s): Medical areas.
 2. Classification: ASTM E1264 Type IV.
 - a. Form: 2, water felted.
 - b. Pattern: "E" - lightly textured.
 3. Size: 24 by 24 inches.
 4. Thickness: 1 inches.
 5. Light Reflectance: 0.86 percent, determined in accordance with ASTM E1264.
 6. NRC Range: 0.75 to 0.85, determined in accordance with ASTM E1264.
 7. Ceiling Attenuation Class (CAC): 38, determined in accordance with ASTM E1264.
 8. Panel Edge: Square.
 9. Suspension System Type 1: Exposed grid.
 10. Products:
 - a. Armstrong World Industries, Inc; Calla Health Zone:
www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Acoustical Panels, Type ACT-4: with the following characteristics:
1. Application(s): Food preparation areas.
 2. Classification: ASTM E1264 Type XX.
 - a. Pattern: C E.
 3. Size: 24 by 48 inch.
 4. Thickness: 3/4 inch
 5. Light Reflectance: 0.79 percent, determined in accordance with ASTM E1264.
 6. NRC Range: 0.50 to 0.60, determined in accordance with ASTM E1264.
 7. Ceiling Attenuation Class (CAC): 38, determined in accordance with ASTM E1264.
 8. Panel Edge: Square.
 9. Color: White.
 10. Suspension System Type 2: Exposed grid.
 11. Products:
 - a. Armstrong World Industries, Inc; Cermaguard Fine Fissured:
www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SUSPENSION SYSTEM

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
 1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
 - b. Aluminum Grid: Aluminum sheet, ASTM B209 (ASTM B209M).
- B. Exposed Suspension System, Type 1: Hot-dipped galvanized steel grid with aluminum cap.
 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.

2. Profile: Tee; 15/16 inch face width.
 3. Finish: Baked enamel.
 4. Color: White.
 5. Products:
 - a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Exposed Suspension System, Type 2: Aluminum grid and cap; factory-applied closed-cell foam gaskets.
1. Application(s): [_____].
 2. Structural Classification: Light-duty, when tested in accordance with ASTM C635/C635M.
 3. Profile: Tee; 15/16 inch face width.
 4. Finish: Baked enamel.
 5. Products:
 - a. Armstrong World Industries; PRELUDE® PLUS XL® – Aluminum: www.armstrongceilings.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
 1. Size: As required for installation conditions.
 2. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.
- C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Install in bed of acoustical sealant.
 2. Use longest practical lengths.

- 3. Overlap and rivet corners.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. Install hold-down clips on panels within 20 ft of an exterior door.
- H. Install hold-down clips at acoustical ceilings in medical area, booking area, vestibules and corridors within the security perimeter.

3.05 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

**SECTION 09 5753
SECURITY CEILING ASSEMBLIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Suspended security metal ceiling grid system.
- B. Perimeter trim and accessories.
- C. Formed metal plank security ceiling panels.
- D. Formed metal panel security ceiling panels.
- E. Acoustical insulation and compatible access door.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of special anchors or inserts for suspension system.
- B. Section 05 0527 - SECURITY METAL FASTENERS.
- C. Section 05 3100 - Steel Decking: Placement of special anchors or inserts for suspension system.
- D. Section 07 9200 - Joint Sealants: Acoustical sealant.
- E. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
- F. Section 23 3700 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- G. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.
- H. Section 27 5116 - Public Address Systems: Speakers in ceiling system.
- I. Section 28 2000 - Video Surveillance.
- J. Section 28 3116 - Addressable Fire Alarm System: Fire alarm components in ceiling system.

1.04 SUBMITTALS

- A. Product Data: Submit copies of manufacturer's descriptive literature and recommended installation instructions and procedures.
- B. Shop Drawings: Prior to fabrication and delivery to job site, submit shop drawings clearly indicating:
 - 1. Ceiling layout with Reflected Ceiling Plan of typical rooms and other spaces.
 - 2. Wall angle attachment details, accompanied by catalog illustrations.
 - 3. Change in level details.
- C. Samples: Submit a 1-foot by 1-foot assembled sample of each ceiling panel, grid, hangers, access door, access opening and wall angle members.
- D. Certification: Submit manufacturer's certificate of compliance with the acoustical noise reduction coefficient (NRC) performance.

1.05 PERFORMANCE

- A. Accessibility: The metal plank ceiling system shall be designed and installed to resist access to the plenum area above except through predesignated access panels that shall be secured to the suspension system with tamper proof screws.

- B. Acoustical Requirements: The ceiling system(s) shall provide a noise reduction coefficient (NRC) of no less than 0.80 when tested in accordance with ASTM C423 in an E-400 mounting as defined in ASTM E795.

1.06 SEQUENCING/SCHEDULING

- A. Do not commence installation of metal security ceilings systems until building is enclosed, sufficient heat is provided, dust-generating activities have terminated, and overhead mechanical and electrical work is completed, tested, and approved.
- B. Schedule installation of ceiling systems after interior wet work is dry and cured.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing and regularly engaged in the domestic manufacture of suspended metal security ceiling systems, types as specified, with a minimum five years experience.
- B. Erector Qualifications: Company specializing in the installation of suspended security ceiling systems, approved by the ceiling system manufacturer, and having a minimum of three years experience.
- C. Single Source Responsibility: All specified ceiling components shall be provided by a single source manufacturer.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Suspended Metal Plank Security Ceiling: BarrierDek system (Basis of Design) as manufactured by Trussbuilt; Vadnais Heights, MN; Telephone 651-633-6100. Subject to compliance with requirements, provide the named product or a comparable product by one of the following.
 - 1. Gordon Corrections Division; Cel Line Plank Ceiling.
 - 2. Kane Innovations Corp; Security Plank Ceilings.
 - 3. Armstrong World Industries; METALWORKS SecureLock Pluse Custom Ceilings.
- B. Suspended Metal Panel Security Ceiling s: SecureDeck system (Basis of Design) as manufactured by Trussbuilt; Vadnais Heights, MN; Telephone 651-633-6100. Subject to compliance with requirements, provide the named product or a comparable product by one of the following.
 - 1. Gordon Corrections Division; Integrum Metal Panel Security Ceilings.
 - 2. Armstrong World Industries; METALWORKS SecureLock.

2.02 SUSPENSION SYSTEM

- A. Security Ceiling Plank:
 - 1. Main Tee Runners:
 - a. Material: Roll-formed from 16 gauge A60 hot-dip galvanized steel, factory prepunched to receive angle hanger fasteners.
 - b. Type: Special security type, overall height of 3-inches with a flange width of 2 1/2-inches.
 - c. Web Design: Double web thickness, without bulb.
 - 2. Perimeter Wall Molding: Exposed wall molding shall be angle shaped and of the same material and finish as the suspension system main Tee runners.
 - 3. Hangers: Formed from 14 gauge, 1 1/2-inch by 1 1/2-inch galvanized slotted steel angles bolted to main Tees at minimum 5-foot centers, and hung from structural members or drilled in anchors.
 - 4. Fasteners:
 - a. Ceiling Planks: Shall be securely fastened to wall angles and tee sections with #10 x 3/4-inch Torx security screws, spaced 4 inches o.c. in cell areas and 6 inches o.c. in

all other areas.

- b. Wall Angles: Shall be fastened to all abutting vertical surfaces through the use of drilled in 3/16-inch diameter by 2 inches long concrete tapping screws at a minimum of 24 inches o.c.

B. Security Panel Ceilings:

1. Main Runners and Cross Tees: Components shall conform to the requirements of a heavy-duty classification in accordance with ASTM C-635. They shall be rolled with a double web and a rectangular bulb from Hot Dipped Galvanized steel, minimum 0.020 inch thick, to an overall height of 1-1/2 inch with a flange width of 15/16 inch. The cross tees shall provide a positive mechanical lock into the main runners.
2. Hangers: Supporting the main runners shall be 12 gauge galvanized steel wire hung on minimum 48 inches centers from the structure above the ceiling.
3. Compression Struts: Shall be composed of telescoping 1/2 inch diameter and 3/4 inch diameter steel galvanized tubing. The 1/2 inch diameter tube shall be notched on one end to fit over the bulb of the main runner. At the other end, a length of 3/4 inch diameter tube is to be telescoped over the top portion of the 1/2 inch diameter tube and screw fastened to it with two (2) 3/8 inch long TEK screws so that the top of the 3/4 inch diameter tube bears on the structure above and the bottom of the 1/2 inch diameter tube fits snugly over the bulb of the main runner. A compression strut is required at each hanger wire and shall be tied to the hanger wire at the top and bottom.
4. Wall Mouldings: Exposed wall moldings shall be channel shaped and be of the same material and have the same finish as the suspension system runners and shall include closure channels to hold perimeter panels in place.
5. Fasteners: All exposed fasteners shall be tamper proof and shall be a minimum No. 12 size. Fasteners are to be selected and furnished by the contractor and approved by the Architect.

2.03 METAL SECURITY CEILING

- A. Ceiling Plank: Factory formed from 16 gauge perforated A60 galvanized formed steel panels 24-inches wide by 8-feet long. Vertical legs of metal planks shall be factory formed so that panels overlap tightly to provide positive self-alignment with adjacent panels.
- B. Ceiling Panel: Ceiling panels shall be nominally 24 inch by 24 inch by 1 inch deep with sloping vertical legs on all four sides. All ceiling panels shall be factory formed from perforated 18 gauge minimum A60 galvanized steel.
 1. All perforated panels shall have .080 inch diameter holes on .220 inch staggered 45 degree centers. When installed, the face of the panels shall rest on the inside surface of the exposed horizontal flanges of the main runners and cross tees.
 2. The sloping vertical legs of the panels shall lock-down positively and continuously under the bottom surface of the bulb of the tee sections, providing a visual concealment barrier without the use of concealed clips or fasteners.

2.04 ACCESSORIES

- A. Accessibility: The metal plank ceiling system shall be designed and installed to resist access to the plenum area. System compatible 2-feet by 3-feet, hinged downward acting, locking (screw three sides 8 inches on center) access doors shall be provided where indicated or as required.
 1. Door shall be constructed as follows:
 - a. 14 gauge steel door with integral 2 3/16-inch formed and welded edges and 360 degree mitered and welded frame.
 - b. Continuous hinge with 3/8-inch pin and ends welded. Hinge leaves shall be 0.120-inch thick.
 - c. Secure door using No.10 Torx security machine screws tapped into frame.

- B. Provide 24-inch by 24-inch by 14 gauge plate overlapping access panels where smaller access openings are required. Round edges and corners, fasten with sixteen evenly spaced No. 10 Torx Security Screws. Two side rows of access panel screws shall engage heel of interlocking channel formed by panel edges 3/8-inch maximum distance from concealed vertical leg.
- C. Provide concealed interlocking cross tee at all panel penetrations to prevent sagging.
- D. Provide access plates for access to valves, dampers, control boxes, etc. as required for access to these items.
- E. Acoustical Materials: The inside surface of all perforated ceiling planks and panels shall be covered with Class "A" fiberglass insulation, wrapped in black Fire Retardant Poly. Insulation shall be of sufficient thickness and density to provide the specified acoustical requirements.

2.05 FINISHES

- A. Preparation: Prior to painting, galvanized steel surfaces shall be cleaned, rinsed and properly treated to receive the final paint finish.
- B. Ceiling Plank and all exposed parts shall receive a factory applied custom color acceptable to the A/E Polyester powder coated paint finish. Finish shall be applied after perforation to insure coating of perforated holes. Panels shall be primed and finish coated twice coated both sides with paint finish to a minimum thickness of 2.5 mil.
- C. Panels shall be wrapped in protective corrugated cardboard or bubble wrap for shipment.
- D. Suspension System and Wall Molding: Shall receive a factory applied polyester finish to match the ceiling panels.

PART 3 EXECUTION

3.01 INSPECTION/COORDINATION

- A. Verify all dimensions, elevation, and that all major above ceiling work is completed.
- B. Prior to installation of security ceiling system, coordinate ceiling unit size with HVAC and electrical components to interface within the ceiling system for compatibility.
- C. Coordinate the locations and installation of hangers with the work of the other trades.

3.02 INSTALLATION - SECURITY SUSPENSION SYSTEM

- A. Install in accordance with ASTM C636/C636M, and CISCA guidelines, in layouts as shown on the drawings, all in accordance with the manufacturer's printed installation instructions and recommended procedures.
- B. The suspension system and wall moldings shall be installed to produce finished ceilings true to lines and levels and free from warp, soiled or damaged grid.
- C. Install ceiling system(s) in a manner capable of supporting all superimposed loads, with maximum permissible deflection of 1/360 of span and maximum surface deviation of 1/8-inch to 12 feet.
- D. Rough Suspension:
 - 1. Hanger Clips, Inserts and Anchors: Install specified items as recommended by manufacturer.
 - 2. Hanger Angles: 1.5-inch by 1.5-inch by 14 gauge, space 4 feet-maximum on center along main runners.
 - 3. Bolt hangers to main runners using 3/8-inch diameter by 1 1/4-inch long bolts, lock washers and nuts.
 - 4. Provide beam clamps with 1/2-inch all thread fittings to support welded end (top) to 14 gauge angle hanger. Beam clamps shall have locking anchor bolt nuts. Drill 5/8-inch hole in angle hanger end top and double nut or lock washer protect all hanger connections top and bottom.

- E. Main Runners: Space at 8 feet on center, in direction of lighting fixtures.
- F. Install wall angles to all abutting vertical surfaces with drilled in anchors spaced at maximum 16 inches o.c.

3.03 INSTALLATION - SECURITY METAL PLANK CEILING UNITS

- A. Fit metal plank ceiling panels to bear on wall molding and tee members, free from damaged edges or other defects detrimental to appearance and function.
- B. Slide metal plank along perimeter angle to create a ship lapped joint between adjoining panels, insuring self-aligning legs overlap each other.
- C. Side stitch ceiling plank panels together along ship lapped panel with self tapping fasteners 18 inches on center. Securely fasten plank to wall molding and tee members with #10 x 3/4-inch Torx security fasteners at 6 inches o.c. (steel rivets are not permitted).
- D. Provide access panels where indicated and if not shown, where required to gain access to valves, unions, traps, switches, relays, air splitter dampers, airstream thermostats, humidistats, air vents, expansion joints, dampers, control boxes, fan powered boxes, coils, duct accessories, cleanouts and other food service, mechanical, electrical work or equipment located above metal security ceilings. Secure ceiling access panels to panel flanges with security screws in accordance with manufacturer's instructions.

3.04 CLEANING AND ADJUSTMENTS

- A. Clean soiled or discolored unit surface after installation.
- B. Touch-up scratches, abrasions, and other defects in painted surfaces.
- C. Remove and replace damaged, uncleanable, or improperly installed ceiling units.
- D. Adjust any sags or twists, and unstraight members that develop in the ceiling system(s).

END OF SECTION

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**SECTION 09 6500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Static control resilient tile flooring.
- C. Resilient base.
- D. Resilient stair accessories.
- E. Installation accessories.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- B. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C. Section 09 0561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- D. Section 26 0526 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

1.04 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
- D. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base.
- F. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- G. ASTM F2169 - Standard Specification for Resilient Stair Treads.
- H. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.05 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- B. Shop Drawings: Indicate floor patterns.
- C. Verification Samples: Submit two samples, 3 by 3 inch in size illustrating color and pattern for each resilient flooring product specified.
- D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

- E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 200 square feet of each type and color.
 - 3. Extra Wall Base: 50 linear feet of each type and color.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Do not double stack pallets.

1.08 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Vinyl Composition Tile - VCT-1: Homogeneous, with color extending throughout thickness.
 - 1. Manufacturers:
 - a. Armstrong Flooring, Inc; Standard Execelon Imperial Texture with Diamond 10 Technology Coating www.armstrongflooring.com/#sle.
 - Basis of Design**
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - c. Mannington Mills, Inc: www.mannington.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
 - 3. Size: 12 by 12 inch.
 - 4. Thickness: 0.125 inch.
 - 5. Pattern: As indicated on drawings.
 - 6. Color: To be selected by Architect from manufacturer's full range.
- B. Vinyl Composition Tile - VCT-2: Homogeneous, with color extending throughout thickness.
 - 1. Manufacturers:

- a. Armstrong Flooring, Inc; Safety Zone Tile: www.armstrongflooring.com/#sle.
Basis of Design
- b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
- c. Substitutions: See Section 01 6000 - Product Requirements.
2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
4. Size: 12 by 12 inch.
5. Thickness: 0.125 inch.
6. Pattern: As indicated on drawings.
7. Color: To be selected by Architect from manufacturer's full range.
- C. Vinyl Composition Tile - VCT-4: Homogeneous, with color extending throughout thickness.
 1. Manufacturers:
 - a. Armstrong Flooring, Inc; Stonetex: www.armstrongflooring.com/#sle.
Basis of Design
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
 2. Size: 18 by 18 inch.
 3. Pattern: As indicated on drawings.
 4. Color: To be selected by Architect from manufacturer's full range.
- D. Vinyl Tile - Type LVT-1: Luxury vinyl tile.
 1. Manufacturers:
 - a. Armstrong Flooring Inc; Unbound with Diamond10 Technology Coating: Luxury Solid Vinyl Tile.: www.armstrong.com/#sle.
Basis of Design
 - b. Burke Flooring; Luxury Vinyl Tiles: www.burkeflooring.com/#sle.
 - c. Johnsonite, a Tarkett Company; [_____]: www.johnsonite.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
 3. Plank Tile Size: 9 by 59 inch.
 4. Wear Layer Thickness: 0.020 inch.
 5. Total Thickness: .200 inch.
 6. Pattern: As indicated on the drawings..
 7. Color: To be selected by Architect from manufacturer's full range.
- E. Static Control Tile - Type VCT-3: Static Dissipative Tile - Homogeneous; color and pattern throughout thickness.
 1. Manufacturers:
 - a. Armstrong Flooring Inc. - Excelon SDT.
Basis of Design
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 2. Minimum Requirements: Vinyl composition tile complying with ASTM F1066, Class 2.
 3. Electrical Resistance:
 - a. Dissipative Tile: Resistance between 1.0 megohms and 1000 megohms as tested in accordance with ASTM F150.
 4. Tile Size: 12 by 12 inch.
 5. Total Thickness: 0.125 inch.
 6. Pattern: As indicated on drawings.
 7. Color: To be selected by Architect from manufacturer's full range.

Install as part of 4-part system including;

8. Armstrong S-202 Static Dissipative Tile Adhesive
9. Excelon SDT 12" x 12" Tile
10. 2" wide x 24" long copper ground connection strips under tile and wall base
11. Armstrong S-392 Static Dissipative Tile Adhesive

2.02 STAIR COVERING

- A. Stair Treads: Vinyl; full width and depth of stair tread in one piece; tapered thickness.
 1. Manufacturers:
 - a. Burke Flooring; Endura Stair Treads: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company; []: www.johnsonite.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
 2. Minimum Requirements: Comply with ASTM F2169, Type TV, vinyl, thermoplastic.
 3. Nosing: Angled.
 4. Striping: 2 inch wide contrasting color abrasive strips.
 5. Texture: Smooth.
 6. Color: To be selected by Architect from manufacturer's full range.
- B. Stair Nosings: 1-1/2 inch horizontal return, 1-1/8 inch vertical return, full width of stair tread in one piece.
 1. Manufacturers:
 - a. Burke Flooring; Ascend Stair Nosings: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company; []: www.johnsonite.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
 2. Material: Rubber.
 3. Nominal Thickness: 0.125 inch.

2.03 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
 1. Manufacturers:
 - a. Burke Flooring; Commercial Wall Base - TS: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - c. Roppe Corp: www.roppe.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 2. Height: 4 inch.
 3. Thickness: 0.125 inch.
 4. Finish: Satin.
 5. Length: Roll.
 6. Color: From manufacturer's full range.
 7. Accessories: Premolded external corners and internal corners.

2.04 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Same material as flooring.
 1. Manufacturers:
 - a. Burke Flooring; Mercer Vinyl Mouldings: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - c. Roppe Corp: www.roppe.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

- D. Copper Grounding Strips: Type and size as recommended by static control flooring manufacturer.
- E. Filler for Coved Base: Plastic.
- F. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 0561.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. Install square tile to basket weave pattern. Allow minimum 1/2 full size tile width at room or area perimeter.
- D. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.05 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.06 INSTALLATION - STAIR COVERINGS

- A. Adhere over entire surface. Fit accurately and securely.

3.07 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.08 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

**SECTION 09 6700
FLUID-APPLIED FLOORING**

PART 1 GENERAL

1.01 RELATE4D DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.03 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.
- B. Section 09 0561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.04 REFERENCE STANDARDS

- A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.05 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.
- B. Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each floor material for each color specified.
- C. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Manufacturer's Qualification Statement.
- F. Applicator's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section.
 - 1. Approved by manufacturer.
- C. Supervisor Qualifications: Trained by product manufacturer .

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store resin materials in a dry, secure area.
- B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.08 FIELD CONDITIONS

- A. Maintain minimum temperature in storage area of 55 degrees F.
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.

- C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fluid-Applied Flooring:
 - 1. Stonhard (Basis of Design): www.stonhard.com.
 - 2. Crossfield Products Corp: www.crossfieldproducts.com/#sle.
 - 3. PPG Paints Megaseal Fluid Applied Flooring: www.ppgpaints.com/#sle and www.ppgpmc.com/home.aspx/#sle.
 - 4. Sherwin-Williams Company: General Polymers Brand: www.generalpolymers.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FLUID-APPLIED FLOORING SYSTEMS

- A. Fluid-Applied Flooring Type 1: Epoxy base coat(s), with broadcast aggregate.
 - 1. Aggregate: Silica sand, texture 3.
 - 2. Top Coat: Epoxy as recommended by the manufacturer.
 - 3. System Thickness: 3/16 inch, nominal, when dry.
 - 4. Texture: Slip resistant.
 - 5. Sheen: Gloss.
 - 6. Color: As selected by Architect.
 - 7. Basis of Design Product: Stonhard; Stonclad GS.
- B. Fluid-Applied Flooring Type 2: Epoxy base coat(s), with antimicrobial additive and broadcast aggregate.
 - 1. Aggregate: Silica sand, texture 3.
 - 2. Top Coat: Epoxy as recommended by the manufacturer.
 - 3. System Thickness: 3/16 inch, nominal, when dry.
 - 4. Texture: Slip resistant.
 - 5. Sheen: Gloss.
 - 6. Color: As selected by Architect.
 - 7. Basis of Design Product: Stonhard; Stonclad GS.

2.03 ACCESSORIES

- A. Base Caps: Zinc with projecting base of 1/8 inch; color as selected.
- B. Cant Strips: Molded of flooring resin material.
- C. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
- D. Primer: Type recommended by fluid-applied flooring manufacturer.
- E. Antimicrobial Additive: Thione compound that acts as a bacteriostat and fungistat when mixed with the fluid applied flooring system.
 - 1. EPA antimicrobial registration #1448-103.
 - 2. Fungi resistance as determine by ASTM G21.
 - 3. Color: Clear.
 - 4. Basis of Design: Stonhard; Stonplus AM9.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561.
 - 2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Prepare concrete surfaces according to ICRI 310.2R, CSP 3.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - ACCESSORIES

- A. Install cant strips at base of walls where flooring is to be extended up wall as base.
- B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness indicated.
- C. Finish to smooth level surface.
- D. Cove at vertical surfaces.

3.05 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Barricade area to protect flooring until fully cured.

END OF SECTION

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**SECTION 09 6813
TILE CARPETING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Carpet tile, **CPT-1** Vestibule Walk-Off Mat.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.
- B. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C. Section 09 0561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- D. Section 26 0539 - Underfloor Raceways for Electrical Systems: Electrical and telephone floor cover plate with recess for carpet.

1.04 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- C. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- E. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- F. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- G. CRI 104 - Standard for Installation of Commercial Carpet.
- H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.05 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- B. Shop Drawings: Indicate layout of joints.
- C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

- H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.07 FIELD CONDITIONS

- A. Carpeting shall be delivered to the job site in original mill wrapping with each roll or tile box having its register number properly attached, clearly marked as to size, dye lot, and materials.
- B. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Tile Carpeting: Basis of Design
 - 1. CPT-1; Entree Tile by Shaw Industries Group, Inc.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Tile Carpeting, Type CPT-1: Tufted, manufactured in one color dye lot.
 - 1. Product: Entree Carpet Tile manufactured by Shaw Contract.
 - 2. Collection: Steppin Out
 - 3. Style Number: 5T033
 - 4. Construction: Needlebond Diagonal
 - 5. Fiber: pet polyester
 - 6. Dye method: 100% solution dyed
 - 7. Primary Backing: synthetic
 - 8. Secondary Backing: ecoworx tile
 - 9. Tile Size: 24" by 24" inch, nominal.
 - 10. Pile Thickness: 0.263 inches
 - 11. Average Density: 6091
 - 12. Total Thickness: 0.348 inches
 - 13. Tufted Weight: 44.5 oz./sq yd
 - 14. Gauge: 1/12
 - 15. Stitches: 11.0
 - 16. Color: To be selected by Architect.
 - 17. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 - 18. Maximum Electrostatic Propensity Charge: <3.5 Kv. at 20 percent relative humidity.
 - 19. Installation Method: Quarter Turn

2.03 ACCESSORIES

- A. Edge Strips: Embossed aluminum, [] color.
- B. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- B. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 09 0561.
 - 2. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 3. Conduct tests by an independent testing agency acceptable to Owner.
 - a. See Section 09 0561.
 - 4. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
 - 5. Follow moisture and alkalinity remediation procedures in Section 09 0561.
- C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 0561.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Vacuum clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Trim carpet tile neatly at walls and around interruptions.
- G. Complete installation of edge strips, concealing exposed edges.

END OF SECTION

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**SECTION 09 9113
EXTERIOR PAINTING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Exposed surfaces of steel lintels and ledge angles.
 - 2. Mechanical and Electrical:
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
 - 7. Floors, unless specifically indicated.
 - 8. Glass.
 - 9. Concealed pipes, ducts, and conduits.

1.03 RELATED REQUIREMENTS

- A. Section 05 5213 - Pipe and Tube Railings: Shop-primed items.
- B. Section 09 9123 - Interior Painting.
- C. Section 09 9600 - High-Performance Coatings.
- D. Section 21 0553 - Identification for Fire Suppression Piping and Equipment: Painted identification.
- E. Section 21 0553 - Identification for Fire Suppression Piping and Equipment: Color coding scheme for items to be painted under this section.

1.04 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.05 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
- D. SSPC-SP 1 - Solvent Cleaning.
- E. SSPC-SP 6 - Commercial Blast Cleaning.

1.06 SUBMITTALS

- A. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- B. Samples: Submit two paper chip samples, 8 1/2 x 11 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 - 2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
 - 3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com.
 - 2. Benjamin Moore & Co: www.benjaminmoore.com.
 - 3. PPG Paints: www.ppgpaints.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of the State in which the Project is located.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including primed metal.
 - 1. Two top coats and one coat primer.

2. Top Coat(s): Exterior Light Industrial Coating, Water Based.
 - a. Products:
 - 1) Benjamin Moore; Super Spec HPD.T.M. Acrylic Semi-Gloss, HP29/FP29.
 - 2) PPG Paints Pitt-Tech Plus DTM Industrial Enamel, 4216 HP Series, Semi-Gloss.
 - 3) Sherwin-Williams; Pre Industrial DTM Acrylic, Semi-gloss, B66 W 1151.
 - 4) Substitutions: Section 01 6000 - Product Requirements.
3. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Galvanized Surfaces:
 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- G. Ferrous Metal:
 1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- H. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

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**SECTION 09 9123
INTERIOR PAINTING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Elevator pit ladders.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Ceramic and other tiles.
 - 8. Glass.
 - 9. Concealed pipes, ducts, and conduits.

1.03 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Shop-primed items.
- B. Section 05 5100 - Metal Stairs: Shop-primed items.
- C. Section 09 9113 - Exterior Painting.
- D. Section 09 9600 - High-Performance Coatings.
- E. Section 21 0553 - Identification for Fire Suppression Piping and Equipment: Painted identification.
- F. Section 22 0553 - Identification for Plumbing Piping and Equipment: Painted identification.
- G. Section 23 0553 - Identification for HVAC Piping and Equipment: Painted identification.
- H. Section 26 0553 - Identification for Electrical Systems: Painted identification.

1.04 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.05 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
- E. SSPC-SP 1 - Solvent Cleaning.
- F. SSPC-SP 2 - Hand Tool Cleaning.
- G. SSPC-SP 6 - Commercial Blast Cleaning.

1.06 SUBMITTALS

- A. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- B. Samples: Submit two paper chip samples, 8 1/2 x 11 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.07 QUALITY ASSURANCE

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

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 - 2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
 - 3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 2. Benjamin Moore & Co.: www.benjaminmoore.com.
 - 3. PPG Paints: www.ppgpaints.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:

- a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of State in which the project is located.
- 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: As indicated on drawings.
 - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
 - 3. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete masonry units, uncoated steel, shop primed steel, galvanized steel, and aluminum.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): Institutional Low Odor/VOC Interior Latex.
 - a. Products:
 - 1) PPG Paints Speedhide Zero Interior Latex, 6-4110XI Series, Flat. (MPI #143)
 - 2) PPG Paints Speedhide Zero Interior Latex, 6-4310XI Series, Eggshell.
 - 3) PPG Paints Speedhide Zero Interior Latex, 6-4510XI Series, Semi-Gloss. (MPI #147)
 - 4) Sherwin-Williams Harmony Interior Acrylic Latex, Flat. (MPI #143)
 - 5) Sherwin-Williams ProMar 200 HP Series, Eg-Shel. (MPI #145)
 - 6) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss.
 - 7) Substitutions: Section 01 6000 - Product Requirements.
 - 3. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
 - b. Eggshell: MPI gloss level 3; use this sheen at gypsum board.
 - c. Semi-Gloss: MPI gloss level 5; use this sheen for concrete masonry units not in inmate cell areas.
 - 4. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
 - 1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): Interior Light Industrial Coating, Water Based.
 - a. Products:
 - 1) PPG Paints Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510 Series, Semi-Gloss. (MPI #153)
 - 2) Sherwin-Williams Pro Industrial Acrylic Coating, Semi-Gloss. (MPI #153)
 - 3) Substitutions: Section 01 6000 - Product Requirements.
 - 4. Top Coat Sheen:
 - a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.

5. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint I-OP-MD-WC - Medium Duty Overhead: Including gypsum board.
 1. Two top coats and one coat primer.
 2. Top Coat(s): Institutional Low Odor/VOC Interior Latex.
 - a. Products:
 - 1) Benjamin Moore; AuraWaterborne Interior Paint Flat Finish, N520/F520.
 - 2) PPG Paints Speedhide Zero Interior Latex, 6-4110XI Series, Flat. (MPI #143)
 - 3) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat.
 - 4) Substitutions: Section 01 6000 - Product Requirements.
 3. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
 4. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
 1. Interior/Exterior Latex Block Filler.
 - a. Products:
 - 1) Benjamin Moore; Ultra SpecHi-Build Masonry Block Filler, 571/K571.
 - 2) Kilz Pro-X p50 Block Filler Primer.
 - 3) PPG Paints Speedhide Masonry Hi Fill Latex Block Filler, 6-15XI . (MPI #4)
 - 4) Sherwin-Williams Loxon Block Surfacer. (MPI #4)
 - 5) Substitutions: Section 01 6000 - Product Requirements.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Gypsum Wallboard: 12 percent.
 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
 - 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- I. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- J. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- K. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

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**SECTION 09 9600
HIGH-PERFORMANCE COATINGS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. High performance coatings.
- B. Surface preparation.

1.03 RELATED REQUIREMENTS

- A. Section 09 6700 - Fluid-Applied Flooring.
- B. Section 09 9123 - Interior Painting: Requirements for mechanical and electrical equipment surfaces.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
- E. SSPC-SP 13 - Surface Preparation of Concrete.

1.05 SUBMITTALS

- A. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
- B. Samples: Submit two samples 8 by 8 inch in size illustrating colors available for selection.
- C. Manufacturer's Certificate: Certify that high-performance coatings comply with VOC limits specified.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include cleaning procedures and repair and patching techniques.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Coating Materials: 1 gallon of each type and color.
 - 3. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document that applies to application on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Control Requirements, for general requirements for mock-up.
- B. Provide mock-up , 10 feet long by 10 feet wide, illustrating coating.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- B. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
- C. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- E. Restrict traffic from area where coating is being applied or is curing.

1.10 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide high performance coating products from the same manufacturer.
 - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 - 2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
- B. High-Performance Coatings:
 - 1. PPG Paints: www.ppgpaints.com/#sle.
 - 2. Sherwin-Williams Company; Basis of Design: www.protective.sherwin-williams.com/industries/#sle.
 - 3. Tnemec Company, Inc: www.tnemec.com/#sle.
 - 4. Substitutions: Section 01 6000 - Product Requirements.

2.02 HIGH-PERFORMANCE COATINGS

- A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."
- B. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:
 - 1. Hardness: [____], when tested in accordance with [____].
 - 2. Adhesion: 100 percent, when tested in accordance with ASTM D3359.
 - 3. Stain Resistance: Resistant to the following substances, when tested in accordance with ASTM D3023.
 - a. Mustard.
 - b. Grape juice.
 - c. Lipstick, red.
 - d. Permanent ink.
 - e. Coffee.
 - f. 10% sodium hydroxide.
 - g. Acetic acid.
 - 4. Scrubbability: 500 to 600 cycles with stiff bristle brush and pumice scrub media, when tested in accordance with ASTM D2486.
 - 5. Chemical Resistance: Resistant to the following substances, when tested in accordance with ASTM D1308.
 - a. Distilled water.
 - b. Ethyl alcohol.
 - c. Vinegar (3% acetic acid).
 - d. Alkali (10% sodium hydroxide).
 - e. Acid (10% sulfuric acid).
 - f. 50/50 xylene/mineral spirits.

2.03 TOP COAT MATERIALS

- A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
 - 1. Lead Content: Not greater than 0.06 percent by weight of total nonvolatile content.
 - 2. Chromium Content, as Hexavalent Chromium, Zinc Chromate, or Strontium Chromate: None.
 - 3. Volatile Organic Compound (VOC) Content:
 - a. Provide coatings that comply with the most stringent requirements specified in the following:
 - 1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2) Architectural coatings VOC limits of State in which the project is located.
 - b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- B. Epoxy Coating:
 - 1. Number of coats: Two.
 - 2. Top Coat(s): Light Industrial Coating, Interior, Water Based Epoxy.
 - a. Sheen: Semi-Gloss.
 - b. Products:

- 1) PPG Paints; Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510 Series, Semi-Gloss; MPI #153: www.ppgpaints.com/#sle.
 - 2) Sherwin-Williams; Pro Industrial Pre-Catalyzed Waterbased Epoxy; MPI #151, 153: www.protective.sherwin-williams.com/#sle.
 - (a) Basis of Design.
 - 3) Tnemec; Enviro-Pox Series 287; www.tnemec.com.
 - 4) Substitutions: Section 01 6000 - Product Requirements.
3. Primer: As recommended by coating manufacturer for specific substrate.
- C. Shellac: Pure, white type.

2.04 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.
1. Block Filler, Latex.
 - a. Products:
 - 1) PPG Paints; 6-15XI Speedhide Masonry Hi Fill Latex Block Filler; MPI #4: www.ppgpaints.com/#sle.
 - 2) Sherwin-Williams; Heavy Duty Block Filler; MPI #4: www.protective.sherwin-williams.com/#sle.
 - 3) Tnemec; Epoxoblock WB Series 1254: www.tnemec.com.
 - 4) Substitutions: Section 01 6000 - Product Requirements.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not begin application of coatings until substrates have been properly prepared.
- C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Cementitious Substrates: Do not begin application until substrate has cured 28 days minimum and measured moisture content is not greater than 12 percent.
 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
- G. Proceed with coating application only after unacceptable conditions have been corrected.
 1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Clean concrete according to ASTM D4258. Allow to dry.
 - 3. Prepare surface as recommended by coating manufacturer and according to SSPC-SP 13.
- E. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by coating manufacturer.
- F. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Concrete: Prior to priming, patch with masonry filler to produce smooth surface.
- C. Concrete Masonry: Apply masonry filler to thickness required to fill holes and produce smooth surface; minimum thickness of 30 mils.

3.04 COATING APPLICATION

- A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in "MPI Architectural Painting and Specification Manual".
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.
- D. See Section 01 7400 - Construction Waste Management and Cleaning, for additional requirements.

3.06 PROTECTION

- A. Protect finished work from damage.

3.07 SCHEDULE

- A. Colors: As selected by the Architect from manufacturer's standard colors.

END OF SECTION

SECTION 10 1100 VISUAL DISPLAY UNITS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Markerboards

1.03 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.

1.04 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard.
- B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's data on chalkboard, markerboard, tackboard, tackboard surface covering, trim, and accessories.
- B. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- C. Samples: Submit color charts for selection of color and texture of markerboard and trim.
- D. Test Reports: Show compliance to specified surface burning characteristics requirements.
- E. Manufacturer's printed installation instructions.
- F. Manufacturer's Qualification Statement.
- G. Maintenance Data: Include data on regular cleaning, stain removal .

1.06 QUALITY ASSURANCE

1.07 WARRANTY

- A. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle.
- B. Nelson Adams NACO: www.nelsonadamsnaco.com/#sle.
- C. Polyvision Corporation: www.polyvision.com/#sle.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 VISUAL DISPLAY UNITS

- A. Markerboards: Porcelain enamel on steel, laminated to core.
 - 1. Color: White.
 - 2. Steel Face Sheet Thickness: 24 gauge, 0.0239 inch .
 - 3. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
 - 4. Backing: Aluminum foil, laminated to core.
 - 5. Size: As indicated on drawings.
 - 6. Frame: Extruded aluminum , with concealed fasteners.
 - 7. Frame Finish: Anodized, natural.

8. Accessories: Provide marker tray and imprinted graphic of floor plans.

2.03 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- C. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

2.04 ACCESSORIES

- A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- B. Marker Tray: Aluminum, manufacturer's standard formed profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.
- C. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Install with top of marker tray at 30 inches above finished floor.
- C. Secure units level and plumb.

3.03 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 1400.11 SIGNAGE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Signage with tactile and non-tactile signage with and without Braille.
- B. Painted signage in designated areas.
- C. Plaques
- D. Dimensional letters signs.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- C. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
- D. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- F. ICC A117.1 - Accessible and Usable Buildings and Facilities.
- G. SAE J1545 - Instrumental Color Difference Measurement for Exterior Finishes, Textiles and Colored Trim.

1.04 SUBMITTALS

- A. Product Data : For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs:
 - 1. Show sign mounting heights and floor plans indicating locations of each sign.
 - 2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- C. Samples for Initial Selection: Submit one sign of each type, style, letter font, and manufacturer's color charts consisting of actual material showing the full range of colors available.
- D. Sign Schedule: Use same designations indicated.
- E. Qualification Data: For fabricator.
- F. Maintenance Data: For signs to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

- C. Regulatory Requirements: Comply with applicable provisions in ADA Standards, 36 CFR 1191 ADA-ABA Accessibility Guidelines, and ICC A117.1.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

1.07 PROJECT CONDITIONS

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

1.08 WARRANTY

- A. Warranty: Limited lifetime in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Rigid Vinyl Sheet: Of thickness indicated, manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers and without plasticizers.
 - 1. Impact Strength: 30.4 ft-lbs/ inch of thickness in accordance with ASTM D256.
 - 2. Stain Resistance: Resistance to stain in accordance with ASTM D543.
 - 3. Fungal and Bacterial Resistance: Does not support fungal or bacterial growth in accordance with ASTM G21.
 - 4. Color Consistency: Matched in accordance with SAE J1545 - (Delta E) with a color difference no greater than 1.0 units using CIE La b, CIE CMC, CIE LCh, Hunter Lab or similar color space scale systems.

2.02 SIGNAGE

- A. Basis-of-Design Product: The design for signage is based on product as manufactured by InPro SignScape, InPro Corporation, WI; Telephone: 800-222-5556. Subject to compliance with requirements, provide the product indicated or a comparable product by one of the following:
 - 1. Advance Corporation; Braille-Tac Division.
 - 2. Bunting Graphics, Inc.
 - 3. Mohawk Sign Systems.
 - 4. Takeform Architectural Graphics.
- B. Tactile and Braille Sign: Provide text and symbols complying with ADA Standards and with ICC A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape:
 - 1. Panel Material: Rigid vinyl sheet.
 - 2. Raised-Copy Thickness: Not less than 1/32 inch.
- C. Partial Inlay: Provide sign panel consisting of 0.080 inch sheet engraved to receive 0.060 inch sheet that is cut and assembled to create signage.
- D. Grade 2 Braille: Provide Grade 2 Braille produced with the Raster Method, patented process for placing Braille on signage. Raster Braille is computer engineered using a carbide-engraving bit, press-fit tool with vacuum pump and UV stable acrylic rasters.
- E. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of transparent covers with paper inserts printed by Owner.

2.03 PLAQUES

- A. Manufacturers:
 - 1. Cosco Industries; Cast Aluminum: www.coscoarchitecturalsigns.com/#sle.
 - 2. FASTSIGNS: www.fastsigns.com/#sle.
 - 3. Matthews Architectural Products; Cast Plaques: www.mathewsid.com.
- B. Metal Plaques:
 - 1. Metal: Aluminum casting.
 - 2. Metal Thickness: 1/8 inch, minimum.
 - 3. Size: As indicated on drawings.
 - 4. Text and Typeface:
 - a. Character Font: As indicated on the drawings.
 - 5. Border Style: As indicated on drawings.
 - 6. Mounting: Rosettes and toggle bolts.
 - a. Rosette Style: Floral.
 - b. Rosette Diameter: 3/8 inch.

2.04 DIMENSIONAL LETTERS

- A. Manufacturers:
 - 1. Cosco Industries; Cast Aluminum: www.coscoarchitecturalsigns.com/#sle.
 - 2. FASTSIGNS; Dimensional Building Letters: www.fastsigns.com/#sle.
 - 3. Lake Shore Industries: www.lsisigns.com
 - 4. Matthews Architectural Products: www.mathewsid.com.
- B. Metal Letters:
 - 1. Metal: Aluminum casting.
 - 2. Metal Thickness: 1/4 inch minimum.
 - 3. Mounting: Concealed screws with stand-off devices from exterior wall..

2.05 ACCESSORIES

- A. Double-sided Foam Tape and Heavy Duty Adhesive: Provide double sided foam tape and heavy duty adhesive to adhere signs to clean, dry, well sealed substrates.
- B. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. General: Locate the signage system as indicated on the approved detail drawing for the appropriate substrate, in compliance with installation instructions, and in accordance with ADA Standards and ICC A117.1.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.

- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Double-sided Foam Tape and Heavy Duty Adhesive: Mount signs to smooth, non-porous surfaces. Do not use this method for vinyl-covered or rough surfaces.
 - 2. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

3.03 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

3.04 SIGN SCHEDULE

- A. Coordinate with Owners numbering and naming requirements.
- B. Provide signs with room number and function for each room listed on the Room Finish Schedule on the Drawings.
 - 1. If room or space has more than one door, provide signage at all door locations.
- C. At individual office spaces, provide insert window for name in addition to room name and room number.
- D. Stair and Elevator signage shall be provided as required by Code.
- E. Directional Signage Type -1F: Provide 10 signs.
- F. Signage in spaces within Housing Pods shall comply with requirements (minus Braille) of this Section but shall be painted signage applied to the walls.

END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Solid plastic toilet compartments.
- B. Urinal screens.

1.03 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.
- B. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.04 REFERENCE STANDARDS

- A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.05 SUBMITTALS

- A. Product Data: Provide data on panel construction, hardware, and accessories.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Samples: Submit two samples of partition panels, 3 by 3 inch in size illustrating panel finish, color, and sheen.
- D. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Solid Plastic Toilet Compartments:
 - 1. Metpar Corp; Standard: www.metpar.com/#sle.
 - 2. Partition Systems International of South Carolina; PolyLife HDPE Toilet Partitions: www.psisc.com/#sle.
 - 3. Scranton Products; Hiny Hiders Partitions: www.scrantonproducts.com/#sle.
 - 4. Substitutions: Section 01 6000 - Product Requirements.

2.02 PLASTIC TOILET COMPARTMENTS

- A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286;
 - 1. Color: Single color as selected.
 - 2. Doors:
 - a. Thickness: 1 inch.
 - b. Width: 24 inch.
 - c. Width for Handicapped Use: 36 inch, out-swinging.
 - d. Height: 55 inch.
 - 3. Panels:
 - a. Thickness: 1 inch.
 - b. Height: 55 inch.
 - 4. Pilasters:

- a. Thickness: 1 inch.
- b. Width: As required to fit space; minimum 3 inch.

2.03 ACCESSORIES

- A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
 - 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Extruded aluminum, anti-grip profile.
 - 1. Size: Manufacturer's standard size.
- C. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hinges: Stainless steel, manufacturer's standard finish.
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
- F. Door Hardware: Stainless steel, manufacturer's standard finish.
 - 1. Door Latch: Slide type with exterior emergency access feature.
 - 2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
 - 3. Provide door pull for outswinging doors.
- G. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.

3.04 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

**SECTION 10 2213
WIRE MESH PARTITIONS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Wire mesh systems for walls.

1.03 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware: Cylinders for locksets.

1.04 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel.
- D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel.

1.05 SUBMITTALS

- A. Product Data: Provide data for mesh materials, finishes.
- B. Shop Drawings: Indicate plan and vertical dimensions, elevations, component details; head, jamb, and sill details; location of hardware. Provide component details, anchorage, and type and location of fasteners.
 - 1. Show field measurements on shop drawings.
- C. Samples: Submit two frame and mesh samples, 8 by 8 inch in size, illustrating mesh material. Submit samples of hinge and latchset illustrating style, color, and finish. Sample will be returned.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.06 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wire Mesh Partitions:
 - 1. Acorn Wire and Iron Works, Inc; Model 130A: www.acornwire.com/#sle.
 - 2. The G-S Company; Sure Guard Standard Duty: www.g-sco.com/#sle.
 - 3. Miller Wire Works, Inc; No. 100M-Standard: www.millerwireworks.com/#sle.
 - 4. Spaceguard Products; BeastWire Mesh Partitions with Woven Wire Mesh-1.5 inch diamond: www.spaceguardproducts.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WIRE MESH PARTITIONS

- A. Wire Mesh Partitions: Factory-fabricated modular assemblies of panels, doors, anchors, hardware, and accessories as required to provide a complete system.
 - 1. Design Criteria:
 - a. Design partition system to provide for movement of components without damage, undue stress on fasteners or other detrimental effects, when subject to design loads.
 - b. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 COMPONENTS

- A. Woven Wire Mesh: Standard duty.
 - 1. Material: ASTM A510/A510M uncoated crimped steel wire.
 - 2. Wire Size: 10 gauge, 0.135 inch.
 - 3. Mesh Opening Size: 1-1/2 inch diamond shape.
 - 4. Mesh Weave: Plain weave, inter-crimped.
- B. Framing and Support Members:
 - 1. Material: ASTM A36/A36M steel shapes and ASTM A500/A500M cold-formed steel.
 - 2. Framing, Corner Posts, and Intermediate Support Members: Manufacturer's standard sizes for system specified and as indicated on drawings.
- C. Doors: Same material as partitions, fully framed; manufacturer's standard construction and hardware for swing operation.
 - 1. Locking: Mortise type cylinder locks as specified in Section 08 7100.
- D. Sheet Metal Base Panel: ASTM A1008/A1008M, cold rolled steel sheet.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.04 FASTENERS

- A. Bolts, Nuts and Washers: Hot dip galvanized.
- B. Anchorage Devices: Provide power driven, powder actuated, and drilled expansion bolts.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, unobtrusively located, consistent with design of structure.

2.05 ACCESSORIES

- A. Bracing: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.
- B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.
- C. Post Caps: Manufacturer's standard.
- D. Floor and Ceiling Pilaster Shoe: Manufacturer's standard.
- E. Floor Base: Manufacturer's standard.

2.06 FABRICATION

- A. Fit and assemble in largest practical sections for delivery to site, ready for installation.
- B. Make exposed joints flush or tight.
- C. Provide mortised and tenoned joints for framing members.
- D. Provide components required for anchorage to adjacent construction.
- E. Frame openings made for penetrating mechanical and electrical components.

2.07 FINISHES

- A. Painted Finish: Manufacturer's standard enamel finish.
 - 1. Color: Black.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that substrate surfaces and required openings are ready to receive work.

3.02 PREPARATION

- A. Clean substrate surfaces.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install items plumb and level, accurately fitted, free from distortion or defects.
- C. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. After installation, touch-up field welds scratched or damaged surfaces with shop applied finish.

3.04 TOLERANCES

- A. Maximum Variation From Plumb or Level: 1/4 inch.
- B. Maximum Misalignment From True Position: 1/4 inch.

3.05 ADJUSTING

- A. Adjust doors to achieve free movement.

3.06 CLEANING

- A. Remove temporary protection to prefinished surfaces.

END OF SECTION

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**SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Commercial shower and bath accessories.
- C. Institutional ligature-resistant toilet accessories.
- D. Under-lavatory pipe supply covers.
- E. Electric hand/hair dryers.
- F. Utility room accessories.

1.03 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Concealed supports for accessories, including in wall framing and plates.
- B. Section 10 2113.19 - Plastic Toilet Compartments.
- C. Section 22 4000 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

1.04 REFERENCE STANDARDS

- A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- C. ASTM C1036 - Standard Specification for Flat Glass.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.06 SUBMITTALS

- A. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Commercial Toilet, Shower, and Bath Accessories:
 - 1. Bradley Corporation; (Basis of Design): www.bradleycorp.com/#sle.
 - 2. American Specialties, Inc: www.americanspecialties.com/#sle.
 - 3. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
 - 4. Substitutions: Section 01 6000 - Product Requirements.
- B. Institutional Ligature-Resistant Toilet and Bath Accessories:
 - 1. Bradley Corporation: www.bradleycorp.com/#sle.

2. Willoughby Industries, Inc: www.willoughby-ind.com.
 3. Substitutions: Section 01 6000 - Product Requirements.
- C. Provide products of each category type by single manufacturer.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 1. Grind welded joints smooth.
 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide [] keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- F. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Single-roll with spare roll, non-controlled delivery, vandal resistant hinged locking cover, Satin finish stainless steel.
 1. Products:
 - a. As indicated on the drawings.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
 1. Capacity: 400 C-fold minimum.
 2. Products:
 - a. As indicated on the drawings.
- C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.
 1. Minimum Capacity: 40 ounces.
 2. Products:
 - a. As indicated on the drawings.
- D. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.
 1. Size: As indicated on the drawings.
 2. Frame: 0.04 inch angle shapes, with mitered corners, and tamperproof hanging system; satin finish.
 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 4. Products:
 - a. As indicated on the drawings.
- E. Grab Bars: Stainless steel, textured surface.
 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.

- b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
- c. Finish: Satin.
- d. Length and Configuration: As indicated on drawings.
- e. Products:
 - 1) As indicated on the drawings.

2.05 INSTITUTIONAL LIGATURE-RESISTANT TOILET AND BATH ACCESSORIES

- A. Toilet Paper Holder: Single roll, recessed, satin finish stainless steel unit with beveled wall flange for standard toilet paper rolls. Install with tamper-resistant screws.
 - 1. Products:
 - a. As indicated on the drawings.
- B. Grab Bars: Type 304 stainless steel, smooth surface with closure plate.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, 1-1/2 inch clearance between wall and inside of grab bar; 14 gauge stainless steel "L" shaped closure plate with wall mounting flange welded to bottom of tube to prevent ligature. Install grab bar and closure plate with tamper-resistant screws through grab bar circular mounting flange and wall flange of flat closure.
 - c. Finish: Satin.
 - d. Length and Configuration: As indicated on drawings.
 - e. Products:
 - 1) As indicated on the drawings.

2.06 COMMERCIAL SHOWER AND BATH ACCESSORIES

- A. Robe Hook: Heavy-duty stainless steel, double-prong, rectangular-shaped bracket and backplate for concealed attachment, bright polished finish.
 - 1. Products:
 - a. As indicated on the drawings.

2.07 UNDER-LAVATORY PIPE AND SUPPLY COVERS

- A. Specified in 22 4000 - Plumbing Fixtures.

2.08 ELECTRIC HAND/HAIR DRYERS

- A. Electric Hand Dryers: Traditional fan-in-case type, with downward fixed nozzle.
 - 1. Operation: Automatic, sensor-operated on and off.
 - 2. Mounting: Surface mounted.
 - 3. Cover: Stainless steel with brushed finish.
 - a. Tamper-resistant screw attachment of cover to mounting plate.
 - 4. Air Velocity: 4,920 to 9,840 linear feet per minute, minimum, at full power.
 - 5. Heater: 900 W, minimum, at full power.
 - 6. Fan/Heater Control: Field adjustable down to approximately half-speed with corresponding reduction in heat output.
 - 7. Total Wattage: 1,150, maximum.
 - 8. Runtime: Automatic shut off in 60 seconds.
 - 9. Supply Voltage: As indicated on drawings.
 - 10. Warranty: Sensors, 1 year, brushes, 3 years,; other components, 10 years.

2.09 UTILITY ROOM ACCESSORIES

- A. Mop and Broom Holder: 0.0313 inch thick stainless steel, Type 304, hat-shaped channel.
 - 1. Holders: Three spring-loaded rubber cam holders.

2. Length: 24 inches.
3. Products:
 - a. As indicated on the drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.
- E. See Section 06 1000 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
 1. Refer to drawings for mounting heights as indicated.

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

**SECTION 10 4400
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.03 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
- B. FM (AG) - FM Approval Guide.
- C. NFPA 10 - Standard for Portable Fire Extinguishers.
- D. UL (DIR) - Online Certifications Directory.

1.04 SUBMITTALS

- A. Product Data: Provide extinguisher operational features.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Larsen's Manufacturing Co; MP-10 (Basis of Design): www.larsensmfg.com/#sle.
 - 2. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 3. Potter-Roemer: www.potterroemer.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Larsen's Manufacturing Co; (Basis of Design): www.larsensmfg.com/#sle.
 - a. Detention Type:
 - 1) Semi-Recessed: Model No. DEC SS 2409-R4.
 - 2) Surface Mounted: Model No. DEC SS 2409-SM.
 - 3) Provide fire rated type where indicated on the drawings.
 - (a) Semi-Recessed Model No. FS DEC SS 2409-R4.
 - (b) Surface Mounted Model No. FS DEC SS 2409-SM.
 - b. Standard Type Semi-Recessed: Model No. SS 2409-R4.
 - 2. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 3. Potter-Roemer: www.potterroemer.com/#sle.

4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 1. Stored Pressure Operated: Deep Drawn.
 2. Class: A:B:C type.
 3. Size: 10 pound.
 4. Finish: Baked polyester powder coat, red color.
 5. Temperature range: Minus 40 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
 1. Formed stainless steel sheet; 0.036 inch thick base metal.
 - a. Construction for both detention and standard types
- C. Fire Rated Cabinet Construction: One-hour fire rated.
 1. Stainless steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
 - a. Construction for both detention and standard types
- D. Cabinet Configuration: Semi-recessed type.
 1. Size to accommodate accessories.
 2. Projected Trim: Returned to wall surface, with 3 1/2 inch projection, and 1 1/4 inch wide face.
 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- E. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- G. Fabrication: Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
- I. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.
- B. Cabinet Signage: Vertical red lettering "FIRE EXTINGUISHER".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

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

- B. Install cabinets plumb and level in wall openings, to height from finished floor as indicated on the drawings to inside bottom of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.
- E. Position cabinet signage at each cabinet.

END OF SECTION

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SECTION 10 5113 METAL LOCKERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Metal lockers.
 - 1. Single tier staff lockers.
 - 2. Multiple tier lockers for visitor storage.
- B. Locker benches.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete base construction.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities.

1.05 SUBMITTALS

- A. Product Data: Manufacturer's published data on locker construction, sizes and accessories.
- B. Shop Drawings: Indicate locker plan layout, numbering plan.
- C. Full Size Sample: One full-size locker of each construction specified for evaluation of construction.
- D. Samples: Submit two samples 3 by 3 inches in size showing color and finish of metal locker material.
- E. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Lockers:
 - 1. Lyon Workspace Products; (Basis of Design): www.lyonworkspace.com/#sle.
 - a. Wardrobe Locker: Single Tier Standard Steel Locker.
 - b. Visitor Storage Locker: Four Tier 1 Wide Standard Steel Locker.
 - 2. Penco Products, Inc: www.pencoproducts.com/#sle.
 - 3. Republic Storage Systems Co: www.republicstorage.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOCKER APPLICATIONS

- A. Wardrobe Lockers: Metal lockers, free standing and wall mounted with base indicated on the drawings.
 - 1. Width: 12 inches.
 - 2. Depth: 18 inches.
 - 3. Height: 66 inches.

4. Configuration: Single tier.
 5. Fittings: Size and configuration as indicated on drawings.
 - a. Hat shelf.
 - b. Coat rod.
 - c. Hooks: Two double prong.
 6. Ventilation: Louvers at top and bottom of door panel.
 7. Locking: Padlock hasps, for padlocks provided by Owner.
 8. Provide sloped top.
- B. Visitor Storage Locker: Metal lockers, wall mounted with matching closed base.
1. Width: 12 inches.
 2. Depth: 12 inches.
 3. Height: 54 inches.
 4. Configuration: Four tier.
 5. Ventilation: Louvers at top and bottom of door panel.
 6. Locking: Built-in key locks with spring bolt action.
- C. Locker Benches: Stationary type; bench top of laminated birch; painted steel pedestals.
1. Accessibility: Comply with ICC A117.1 and ADA Standards.

2.03 METAL LOCKERS

- A. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
1. Color: To be selected by Architect.
- C. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
1. Body and Shelves: 24 gauge, 0.0239 inch.
 2. Metal Base Height: 4 inch.
- D. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
1. Door Frame: 16 gauge, 0.0598 inch, minimum.
- E. Doors: Channel edge; welded construction, manufacturer's standard stiffeners, grind and finish edges smooth.
1. Door Thickness: 16 gauge, 0.0598 inch, minimum.
 2. Form recess for operating handle and locking device.
- F. Hinges: Heavy duty, 5-knuckle type; two for doors under 42 inches high; three for doors over 42 inches high.
- G. Sloped Top: 20 gauge, 0.0359 inch, with closed ends.
- H. Trim: 16 gauge, 0.0598 inch.
- I. Coat Hooks: Stainless steel or zinc-plated steel.
- J. Number Plates: Provide oval shaped aluminum plates. Form numbers 3/8 inch high of block font style with ADA designation, in contrasting color.
- K. Locks: Locker manufacturer's standard type indicated above.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared bases are in correct position and configuration.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Place and secure on prepared base.
- C. Install lockers plumb and square.
- D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.
- E. Bolt adjoining locker units together to provide rigid installation.
- F. Install end panels, filler panels, and sloped tops.
- G. Install fittings if not factory installed.
- H. Replace components that do not operate smoothly.

3.03 CLEANING

- A. Clean locker interiors and exterior surfaces.

END OF SECTION

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**SECTION 10 5500
POSTAL SPECIALTIES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Wall mounted mail boxes.

1.03 REFERENCE STANDARDS

- A. 39 CFR 111 - U.S. Postal Service Standard 4C.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, maintenance information, and current USPS approval documentation.
- B. Shop Drawings: Indicate plans for each unit or groups of units, front elevations with compartment layout and model number, overall dimensions, rough-in opening sizes, construction and anchorage details.
- C. Samples: Submit two sets of manufacturer's available colors.

1.05 WARRANTY

- A. Provide manufacturer's warranty against defects in materials or workmanship for a period of 5 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 CENTRAL MAIL DELIVERY BOXES

- A. Wall-Mounted Mailboxes: Fully-recessed, complying with 39 CFR 111 (USPS-STD-4C).
 - 1. Front-loading with pair of master doors, double-column design, 102 customer compartments, 1 outgoing mail compartment, and no parcel compartments.
 - a. Florence Manufacturing Company; Model 1600 Series.
 - b. Salsbury Industries; Model 4B+ Horizontal Mailboxes.

2.02 COMPONENTS

- A. Locking - Customer Compartment Doors: USPS approved cam lock, 3 keys each lock.
- B. Identification - Customer and Parcel Compartments: Sequential numerical or alphabetic characters, top to bottom, left to right; factory-installed.
 - 1. Customer Name Marking: Self-adhesive labels; attach below front of each compartment shelf.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough-openings are ready to receive wall-mounted units.
- B. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install postal specialties in accordance with approved shop drawings, manufacturer's instructions, and USPS requirements.
- B. Adjust and lubricate door hardware to operate properly.

END OF SECTION

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SECTION 10 5626
INMATE PROPERTY STORAGE SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SUMMARY

- A. This section includes the following:
 - 1. Tri-spoke handle driven mechanical assist carriages and related equipment containing storage housings herein specified.

1.03 RELATED WORK FURNISHED BY OTHERS

- A. Base floor capable of withstanding line load weight distribution created by load transfers from weight of system, storage housings, media, and occupants.
- B. Finished floor material and installation within system footprint.

1.04 REFERENCES

- A. American National Standards Institute (ANSI) Standards
- B. American Society for Testing and Materials (ASTM) Standards

1.05 DESCRIPTION

- A. General: High-density mobile storage system consisting of storage housings mounted on wheeled carriage assemblies riding on multiple steel rails. Purpose is to allow multiple ranges of storage housings to be accessed by means of one roving aisle, thus greatly reducing floor space requirements from that of conventional rows of storage housings. For clarification, the term storage housing shall refer to the shelving, rack, or cabinets which are a component of the high-density mobile system herein specified.
- B. Carriage: The carriage shall be formed of a welded structural steel frame with machined steel wheels mating and/or aligning to corresponding steel rails. All bearings shall be permanently lubricated and shielded.
- C. Drive Controls: Triple arm operating control with ergonomic user-friendly knobs shall be provided on the drive ends. A minimum of one operation knob per carriage shall be within ADA reach guidelines at all times.
 - 1. Front drive control consisting of chain, sprocket, and upper drive bearing assembly shall be completely self-contained and enclosed within a steel housing independent of the face panel and shall be an integral part of the carriage structure. Carriage end panel drive assemblies which merely attach to the face panel and are not supported by a dedicated structure shall be unacceptable. Carriage drive mechanism shall be a direct line shaft thru-wheel drive to provide an efficient, smooth, non-binding, and non-slipping movement. Drive system shall be designed to provide a movement of up to 4,000 lbs. of load with only 1 lb. of user effort at the drive control handle.
 - 2. API bearings in drive system shall be permanently lubricated and shielded.
- D. Safety Items:
 - 1. A user activated safety locking mechanism shall be provided at every carriage control to prevent unintentional carriage movement.
- E. Finishes:
 - 1. Metal Components and Assemblies:
 - a. All components shall be finished with an electrostatically applied Gloss-Tek™ powder coat. Finish shall consist of a non-glare raised surface that provides scuff and

scratch resistance. Finish shall be a non-VOC emitting hybrid powder coat which meets or exceeds ASTM test criteria for adhesion, flexibility, hardness, and humidity resistance. A minimum of 29 standard manufacturer's colors shall be offered at no additional charge and a minimum of 3 standard metallic colors shall be provided at an upcharge not to exceed 15%. Any special color match shall be made available per the standard manufacturer's published policy.

2. Laminate Panels:

- a. Low Pressure Laminate Finish. To be selected from manufacturer's standard Thermal Fused low pressure laminate finishes.

F. Sizes: Per manufacturer's standard offering.

1.06 PERFORMANCE REQUIREMENTS

A. Design Requirements:

1. Consult drawing for plan view and elevation details.
2. For ceiling height or sprinkler code requirements, rail with required grout for leveling, carriage structure, and storage housing heights must be considered for an overall system height.
3. Carriages shall be designed to accommodate existing or new storage housings as specified in accompanying documentation.
4. Space for a minimum of 340 Inmate property bags must be provided. Consult drawing for plan view and elevation details.
5. Available in standard heights of 85-1/4 inches.

1.07 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature and installation instructions.
- B. Drawings: Provide dimensional layout of complete system including elevations, adjacent room details including pertinent notations and descriptions. Provide dimensional drawings including elevations of all storage housings Vacating on or adjacent to the system specified.
- C. Initial Selection Samples: For initial selection of colors and textures, submit manufacturer's color chart(s) showing full range of colors and textures available.
- D. Warranty: Submit a copy of manufacturer's warranty.
- E. Maintenance Data: Provide manufacturer's operation manual, maintenance and care instructions, and instructions for care and cleaning of the finish.
- F. Reference List: Provide list of recently installed similar type high-density mobile installations.
- G. A list shall be submitted of all specification deviations with a complete description and VALICATIONVALIDATION.

1.08 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage an experienced manufacturer who has been continuously manufacturing this type of product without interruption for a minimum of 20 years and can supply a list of references upon request.
- B. Manufacturing Qualifications: Engage an experienced manufacturer whose internal processes meet or exceed ISO 9001 requirements.
- C. Installer Qualifications: 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.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's instructions and recommendations for delivery, storage and handing requirements.

1.10 PROJECT CONDITIONS

- A. Field Measurements: Verify all dimensions of perimeter area and proposed system prior to manufacture. Any variations shall be addressed by the general contractor or designated project representative prior to manufacture. Coordinate fabrication and delivery to ensure there is 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 high-density mobile storage units. At this point it is the sole responsibility of the general contractor or designated project representative to coordinate verified field dimensions with the manufacturer in a timely fashion.

1.11 SEQUENCING AND SCHEDULING

- A. Sequence high-density mobile storage system with adjoining work to minimize possibility of damage and soiling during entire construction period.
- B. Schedule installation of specified high-density mobile system after finishing operations; including painting have been completed.
- C. Delivery, Storage, and Handling: Comply with all instructions and recommendations made by manufacturer or manufacturer's representative for delivery, storage, and handling requirements.
- D. 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. Prime contractor or representative
 - c. Architect.
 - d. Manufacturer's representative
 - e. Subcontractors or installers whose work may affect, or be affected by the installation of this system.

1.12 WARRANTY

- A. Provide a written warranty, executed by contractor, installer, and manufacturer, agreeing to repair or replace equipment which fails in materials or workmanship within the established warranty period. This warranty shall be in addition to, and not a limitation of, other rights the owner may have under general conditions provisions of the contract documents.
- B. In addition, shall warrant the high-density mobile storage system against defects in material and workmanship for a minimum of 10 years from date of final acceptance by owner.

PART 2 — PRODUCTS

2.01 MANUFACTURERS

- A. High-Density Mobile Storage Shelving: Specifications stated herein are based upon high-density compact mobile storage products manufactured by Aurora Storage Products, Inc. Other manufacturers may be included following written acceptance:
 - 1. Datum Storage Solutions.
 - 2. Montel.
 - 3. SpaceSaver Corporation.

2.02 BASIC MATERIALS

- A. General: Provide materials and quality of workmanship, which meet or exceed established industry standards for products specified. Material selection and composition shall be manufacturer's option unless indicated otherwise. Fabricate units from ASTM Class 1, cold-rolled commercial grade sheet or coil steel with all bends and radiuses consistent and true.

- B. Laminate Panels:
 - 1. High Pressure Plastic Laminate: Shall conform to NEMA LD-3 .040 inch vertical grade.
 - 2. Low Pressure Laminate: Shall be constructed from 3/4 inch, 45 lb./cu. ft. particleboard core panel with integral thermal fused laminated surface on face and back.
- C. Grout: 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 and non-shrink. The grout after curing shall have a minimum strength of 8000 pounds per square inch.

2.03 HIGH-DENSITY MOBILE STORAGE SHELVING COMPONENTS

- A. Rail:
 - 1. Rail shall be ASTM/AISI Type 1045 steel of manufacturer's selection designed and manufactured to carry a load of 1000 pounds per lineal foot of carriage length.
 - 2. Rail shall be designed to be anchored to structurally sound base floor capable of supporting fully loaded system and exhibiting a maximum deflection not to exceed L/700.
 - 3. Rail shall be positioned, leveled and grouted in accordance with the manufacturer's instructions, providing a minimum of 7/16 inch of grout under the rail from the high spot on the floor. Void under leveled rail shall be completely filled with a non-shrink grout.
 - 4. Shimming of rail is not acceptable either as a means of support or for leveling. Rail shall be drilled and tapped to accommodate leveling screws adjacent to all anchor holes. Each rail shall have a minimum width of 2-3/8 inch and all rails must extend completely under all stationary ranges.
 - 5. Rail shall be level not to exceed 1/16 inch maximum variation from true level within module and 1/16 inch maximum variation between adjacent rails perpendicular to rail direction. Each section of rail shall be a minimum of 12 inches and a maximum of 120 inches with shorter length used only to terminate each individual rail assembly.
 - 6. Each end of the rail shall be connected by means of twin stainless steel dowels pinned between the rail splice. The splice shall be designed for the most severe operating conditions. Connection joints shall demonstrate vertical and horizontal continuity and provide a transfer of load to and from the adjoining rail sections. Butt splice joints and tongue and groove rail splice joints which only prevent movement in one direction are unacceptable.
 - 7. Rails shall be installed to provide for anticipated expansion of one additional carriage 48 inches wide.

2.04 CARRIAGES:

- 1. Carriages are to be welded steel construction. Riveted or bolted carriages shall be unacceptable. Galvanized components are unacceptable. Components of unlike finish or material are unacceptable.
- 2. Overall height shall be no greater than 4-1/2 inches from top surface of rail to base for storage housing on top of carriage.
- 3. Carriage shall be designed for a capacity of 750 pounds per linear foot.
- 4. Carriage construction shall provide for shelving to be securely anchored with vibration-proof fasteners.
- 5. Carriages designed to recess the shelving or storage housing, thus causing the carriage to protrude beyond the plane of the face of the shelving or storage housing shall be unacceptable.
- 6. Carriages shall be powder coat finished inside and out. Galvanized components are unacceptable.
- 7. Fixed carriages shall be of the same construction and height as the mobile carriages and securely anchored to the continuous rail located beneath the fixed carriages.

8. Splices shall be designed to maintain proper unit alignment with no visible fasteners on the outside of the carriage. Fasteners connecting any carriage splice joint shall be vibration-proof in design.
9. Carriages shall be straight and square. There shall be no movement in any splice or welded joint when loaded to recommendation and normal operation is applied.

2.05 WHEELS:

1. All wheels whether load or driven shall be a minimum of 3-5/8 inches in diameter, constructed of cast ductile iron, and precision machined for smooth operation and to ensure compatibility to the corresponding rail.
 2. Bearings shall be permanently lubricated and shielded.
 3. Dynamic load rating on wheel bearings shall be a minimum of 5775 pounds per wheel.
- B. Guidance:
1. Guide Design:
 - a. API rails and wheels shall guide carriage to ensure precise carriage tracking alignment.
 - b. All rails shall have a convex top surface to provide friction-free self-centering alignment with the carriage wheels.
 - c. All carriage wheels shall have a concave load surface which aligns with the rail to provide precise carriage tracking.
 - d. Roller guide and wheel flange methods of guidance which have play between the guide points and the rail sides shall be unacceptable.
 2. Drive Design:
 - a. Carriage drive shall consist of a continuous thru-wheel shaft assembly driving all rails.
 - b. Drive shaft shall be a minimum of 3/4 inch diameter solid steel and a non-load bearing member of the drive mechanism for ease of movement.
 - c. Couplers shall be securely keyed into place to prevent looseness in the drive mechanisms.
 - d. Systems that do not drive all rails shall be unacceptable.
- C. Operation:
1. Gearing requirements unless specified will be at the discretion of the manufacturer based on anticipated weight load and carriage size. Reduction drive units must be available at the following ratios resulting in the noted carriage travel per revolution of the operator control handle:
 - a. 1:2000 ratio / 8-3/4 inches travel per revolution of operation handle.
 2. Operator handles shall be provided in an ergonomic three-spoke design with rotating knobs.
 3. All operator handles shall be provided with a minimum 1.75 inch diameter ergonomic push-pull knob (Aisle Safety Lock) located at the center of the operator handle to secure adjacent carriages in place while an aisle is being occupied. Smaller knobs shall be unacceptable.
 4. Operator handles and aisle access both into and around the system shall conform to all applicable codes including but not limited to the Americans with Disabilities Act.
- D. End/Face Panels:
1. End panels shall be provided to cover the drive chain mechanism and enhance the aesthetics of the system.
 2. End panels must extend the full width of the carriage and extend from the bottom edge of the carriage to the top of the storage housing on the carriage.
 3. End panel selection shall be from the following option:
 - a. Thermal Fused Low Pressure: Shall consist of plastic laminate clad particle board with black plastic integral side edge covers and spacer tubes.

2.06 METAL STORAGE SHELVING COMPONENTS

- A. Manufacturer: Products are based upon Quik-Lok four-post shelving manufactured by Aurora Storage Products, Inc.
- B. Design:
 - 1. Four-post type consisting of uprights, shelves, shelf supports, and Quik-Bases**, designed to be assembled without fasteners or clips. Shelves (except for divider locating slots where applicable) and upright posts shall have no holes on any exposed surface faces. Cross-bracing of any sort shall be unacceptable. Shelf fronts and backs shall be flush with outside faces of upright posts. Back Panels when required shall be flush with the post face and require no additional tools or hardware to install. Design shall permit individual shelf adjustment or removal anywhere along the entire height of the shelving unit. Shelving shall require no tools to erect or make adjustments to, including relocation or removal of individual shelves.
- C. Uprights:
 - 1. Formed from steel sheet to tubular "T" (tee) shape posts for intermediate supports and tubular "L" (angle) shape posts for end supports. Posts shall have keyhole slots on inner wall only and shall have either a full size sheet steel panel or tie strips linking the posts and forming an upright. Upright quantities, sizes, and types are to be determined by plan view and elevations.
 - 2. Closed Uprights:
 - a. Single unit (starter) and/or row end uprights on a range of shelving shall consist of two 1 inch wide 18 gauge cold rolled steel posts roll formed into a tubular "L" formation. Keyhole slots shall be punched on the inner wall only located on 1-1/2 inch centers. There shall be no holes in the outside face surface of the posts. The front and back posts shall be joined by welding a full height 24 gauge closure sheet to provide the required upright depth and structural rigidity. Closed "L" (angle) uprights to be manufactured to heights specified.
 - b. Intermediate (adder) uprights located between and linking shelf sections within a range of shelving shall consist of two 2 inch wide 18 gauge cold rolled steel posts roll-formed into a tubular "T" formation. "T" uprights shall be used as a common upright between units. Keyhole slots shall be punched on the inner wall only located on 1-1/2 inch centers. There shall be no holes in the outside face surface of the posts. The front and back posts shall be joined by welding a full height 24 gauge closure sheet to provide the required upright depth and structural rigidity. Closed "T" (tee) uprights to be manufactured to heights specified.
- D. Shelves:
 - 1. Shelf shall be formed from 18 gauge cold rolled sheet steel with 5/8 inch flanges on all sides and a return hem on the front and back flanges. Shelves shall be independently adjustable on 1-1/2 inch centers. If slotted, single entry shelves shall have two rows, and double entry 4 rows of slots to accept file divider tabs. If plain, no holes shall be permitted on shelf surface for shelf depths less than 18 inches.
- E. Canopy Tops:
 - 1. Same construction as shelf. Must be plain, exhibiting no holes on surface for depths less than 18 inches.
- F. Shelf Supports:
 - 1. Formed from heavy gauge sheet steel. 48 inch shall be formed of 11 gauge hot rolled pickled steel to the specified width by 1-1/4 inch high with two additional return flanges to form a structural channel. A 13/16 inch flange at each end shall be left unformed to accept two shoulder rivets. Rivets shall be 7/16 inch diameter at the head, solid steel, and spaced to interlock into keyhole slots on the inner wall of upright post.

- G. Nominal Dimensions:
 - 1. Width: 48 inches or as required to best meet available room area and media dimensions.
 - 2. Depth: 24 inches.
 - 3. Shelf Edge Vertical Profile: 3/4 inch maximum.
- H. Accessories:
 - 1. Garment Bag Storage System consists of 2 side support brackets and 1 full width garment rail per level, two levels in height, 15 total bags per unit.
 - a. Initial capacity of 340 bags with 120 added upon installation of expansion unit.
 - b. Metal numeric tags identifying bag position to be provided and installed on each level during installation.
- I. Environmental Requirements: All carriages, steel shelving, and steel end panels shall contain a minimum of 40% recycled steel content, comprised of a mixture of post and pre-consumer and industrial. Finishes on carriages, steel shelving, and steel end panels shall be a Gloss-Tek™ powder coat finish with low VOC (volatile organic compounds) and application must incorporate a powder recycle process.

2.07 FABRICATION

- A. General: Coordinate all parties to ensure timely execution of this project and to related work. Ensure that all necessary information relating to this portion of the project has been transmitted to the parties involved.

PART 3 — EXECUTION

3.01 EXAMINATION

- A. Verify that building floor structure is adequate to support high-density mobile system within limits of established deflection criteria based on mobile system type and manufacturer's published criteria.
- B. With installer present, examine floor area within area of mobile system to verify that it is in condition per manufacturer's requirements for rail installation.
- C. With installer present, examine mobile carriages for proper sizing, proper placements of support members for the shelving, and to ensure that mounting surface is square and level
- D. For all installations it shall be the installer's responsibility to know and to execute all phases of the installation in compliance with local building codes.

3.02 INSTALLATION

- A. General: Follow all manufacturer's documented instructions and procedures for installation of rail{, floor and ramp if applicable}, fixed and movable carriages, shelving, panels and related accessories.

3.03 FIELD QUALITY CONTROL

- A. Verify all fixed and movable carriages are installed and operating square and level. Correct if necessary.

3.04 VERIFY ALL END OR FACE PANELS, SHELVING COMPONENTS AND ACCESSORIES ARE ALIGNED PROPERLY. CORRECT IF NECESSARY.

- A. Replace components that are scratched, dented, or damaged in any manner with new items from the manufacturer. Surface scratches may be touched up but repair must be complete and undistinguishable.

3.05 ADJUSTING

- A. Adjust all components and accessories to provide smooth operation and proper tracking alignment. Perform final visual check that all panels align when aisles are closed, and all gaps are consistent.

3.06 CLEANING

- A. Upon completion of installation, clean all components and surfaces. Cover to protect from dust and environmental fallout as a result of other work continuing in the surrounding area. Remove all packaging material and debris that accumulated as a result of the installation immediately upon completion. Leave area of installation neat, in broom clean condition, and ready to present to appropriate persons.

3.07 DEMONSTRATION AND TRAINING

- A. Schedule and conduct demonstration of the high-density mobile system. Review all safety features and proper carriage operation with owner's personnel. Review any additional features or points of interest as appropriate.
- B. Schedule and conduct maintenance training with owner's maintenance personnel. Training session should include a full operation demonstration and all preventative maintenance and minor repair procedures for the high-density mobile system that they would normally be expected to perform.

3.08 PROTECTION

- A. Protect system against dirt and damage during remainder of construction period. Recommend to owner of any additional precautions needed to ensure that system will remain unharmed during balance of construction in surrounding area.

END OF SECTION

SECTION 10 7500 FLAGPOLES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Aluminum flagpole accessories and base for reuse of existing flagpole.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete base and foundation construction.
- B. Section 31 2323 - Fill: Sand to fill foundation tube sleeve.

1.04 REFERENCE STANDARDS

- A. AASHTO M 36 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.

1.05 SUBMITTALS

- A. Product Data: Provide data on pole, accessories, and configurations.
- B. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.
- C. Designer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

1.07 PROJECT CONDITIONS

- A. Relocate and install flagpole from County storage.

PART 2 PRODUCTS

2.01 ACCESSORIES

- A. Finial Ball: Aluminum, 6 inch diameter.
- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
- C. Flag Design: Nylon fabric, brass grommets, hemmed edges.
 - 1. United States flag: 6 feet by 10 feet.
 - 2. Commonwealth of Pennsylvania flag: 5 feet by 8 feet.
- D. Cleats: 9 inch size, aluminum with stainless steel fastenings, two per halyard.
- E. Halyard: 5/16 inch diameter polypropylene, braided, white.

2.02 MOUNTING COMPONENTS

- A. Foundation Tube Sleeve: AASHTO M 36, corrugated 16 gauge, 0.0598 inch steel, galvanized, depth of 42 inches as indicated.
- B. Pole Base Attachment: Flush; aluminum base with base cover.
- C. Lighting Ground Rod 18 inch long steel, 3/4 inch diameter.
- D. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.
 - 1. Length as recommended by the manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.02 PREPARATION

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

- A. Install flagpole , base assembly, and fittings in accordance with manufacturer's instructions.
- B. Fill foundation tube sleeve with sand specified in Section 31 2323 and compact.
- C. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1 inch.

3.05 ADJUSTING

- A. Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION

**SECTION 11 1313
LOADING DOCK BUMPERS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Loading dock bumpers of reinforced rubber pads with attachment frame.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of loading dock bumper frame anchors into concrete.

1.04 SUBMITTALS

- A. Product Data: Submit data on unit dimensions, method of anchorage, and details of construction.
- B. Manufacturer's Installation Instructions: Submit installation requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Loading Dock Bumpers:
 - 1. Blue Giant Equipment Corporation; Model DB411 (Basis of Design): www.bluegiant.com/#sle.
 - 2. Chalfant Sewing Fabricators, Inc: www.chalfantusa.com/#sle.
 - 3. Durable Corp: www.durablecorp.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Loading Dock Bumpers: Fabric reinforced rubber pads, ozone resistant, laminated and compressed in position using two galvanized steel rods with threaded ends, washers, and nuts between 3 inch high by 2-1/2 inch wide by 1/4 inch thick galvanized steel angle end plates.
 - 1. Projection From Wall: 4-1/2 inches.
 - 2. Vertical Height: 10 inches.
 - 3. Width: 14 inches.
 - 4. Profile: Rectangular.
- B. Attachment Hardware: 3/4 inches diameter galvanized bolts with expansion shields.
- C. Touch-up Primer: Zinc rich type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that anchor placement is acceptable.

3.02 INSTALLATION

- A. Install dock bumpers in accordance with manufacturer's instructions.
- B. Set plumb and level.
- C. Secure angled end frames to concrete; refer to Section 03 3000 for additional information.
- D. Weld angled end frames to embedded anchors, and touch up welds with primer.

END OF SECTION

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**SECTION 11 1319.13
LOADING DOCK LEVELERS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Prefabricated steel dock leveler.
- B. Hydraulic operating hardware.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete pit.
- B. Section 11 1313 - Loading Dock Bumpers.

1.04 SUBMITTALS

- A. Product Data: Provide materials and finish, installation details, roughing-in measurements, and operation of unit.
- B. Shop Drawings: Indicate required opening dimensions and tolerances, and perimeter conditions of construction.
- C. Manufacturer's Installation Instructions: Indicate special requirements.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.
- F. Welder's Qualification Statement.
- G. Operation Data: Provide operating instructions, and identify unit limitations.
- H. Maintenance Data: Provide unit maintenance information, lubrication cycles, and provide spare parts manual.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience and approved by manufacturer.
- C. Welder Qualifications: Welders employed for work of type specified with at least three years of documented experience, and verification of American Welding Society (AWS) certification within previous 12 months.

1.06 WARRANTY

- A. Manufacturer agrees to correct defective work within one year period after Date of Substantial Completion.
 - 1. Manufacturer agrees to correct defective work within the time periods specified below after Date of Substantial Completion.
 - a. Structure: Nine years following expiry of the Base Warranty time period.
 - b. Hydraulics: An additional one year following expiry of the Base Warranty time period. Components shall include powerpack motor, hydraulic pump, hydraulic hoses and hydraulic fittings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Loading Dock Levelers:
 - 1. Blue Giant Equipment Corporation; HA6006 (Basis of Design): www.bluegiant.com/#sle.
 - 2. Kelly Company: www.kelleycompany.com/#sle.
 - 3. Rite-Hite Corp: www.ritehite.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Loading Dock Leveler:
 - 1. Operation: Hydraulic.
 - 2. Deck Width: 72 inch.
 - 3. Deck Length: 75 1/2 inch.
 - 4. Operating Range: 12 inch above dock level, 12 inch below dock level.
 - 5. Capacity: 50,000 lbs.
 - 6. Electrical Power Requirements: 208 volts, [] amperes, three phase.
- B. Deck: 1/4 inch steel checker plate deck, reinforced on underside, welded to fabricated steel frame; counter balanced with 16 inches long automatically operated plate lip; lip to lock in downward vertical position when leveler is at rest at dock level.
- C. Operation: Hydraulic Operating System: Easy to operate, quiet and smooth cycling. Electro-hydraulic raising and hydraulic lowering of the dock leveler controlled from a remote pushbutton station. Includes means of lowering the dock leveler below platform level with lip retracted behind dock bumpers. The loaded ramp's free fall is limited to not over 3 inches by a hydraulic velocity fuse. Unit shall come complete with a 1HP TENV motor and equipped with overload protection. Power pack mounted underneath the deck.
 - 1. Control Station: Blue Giant Model SP1. Remote push-button control station.
 - 2. Standard Features:
 - a. NEMA4X/IP65 plastic enclosure- resistant to both corrosion and wet conditions.
 - b. UL/CSA/CE approved.
 - 3. Provide a single push button control station with constant pressure "I" (UP) button. Control station is NEMA4X / IP65 rated, 3-1/4 inch wide by 6-1/2 inch high by 5-1/8 inch deep in size (standard).
 - 4. Power: 24 volts, [] amperes, single phase.

2.03 FINISHES

- A. Leveler Platform: Galvanized.
- B. Leveler Frame: Factory enameled finish.
- C. Pit Frame: Factory applied rust inhibitive primer and standard finish paint.
- D. Toe Guards: Painted safety yellow as specified by ANSI Z535.1. High visibility OSHA safety striping on stationary side toe guards.
- E. Provide galvanized finish at minimum of 1.25 oz/sq ft.

2.04 ACCESSORIES

- A. Loading Dock Bumpers: Refer to Section 11 1313.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough-in openings are acceptable.

3.02 INSTALLATION

- A. Install dock leveler unit in prepared opening in accordance with manufacturer's instructions.
- B. Set square and level.
- C. Anchor unit securely, flush with dock; weld back of leveling dock to pit frame, and touch-up welds with primer.

3.03 ADJUSTING

- A. Adjust installed unit for smooth and balanced operation.

END OF SECTION

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**SECTION 11 1700
TELLER AND SERVICE EQUIPMENT**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Bullet Resistant Devices.
 - 1. Thru-wall drawer.
 - 2. Bullet resistant package passer.
 - 3. Speaking port device.

1.03 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Openings in masonry walls.

1.04 REFERENCE STANDARDS

- A. UL 752 - Standard for Bullet-Resisting Equipment.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's data sheets on each product to be used.
- B. Shop Drawings: Indicate details of materials, construction and finish. Include relationship with adjacent construction.
- C. Certificate: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Instructions: Indicate procedures for installation.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver product to project site in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

1.08 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.09 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.01 THRU-WALL DRAWER

- A. Basis of Design Manufacturer: Total Security Solutions.; Thru-Wall Drawer:
<https://www.tssbulletproof.com>.
- B. Other Acceptable Manufacturers:
 - 1. Quickserv Corp; QST-625: <https://www.quickserv.com>.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- C. Description:
 - 1. Materials: 10 gauge, stainless steel, UHMW sliding drawer and 14 gauge stainless steel flange frame. Drawer provided with sliding tracks and stainless steel push handle.
 - 2. Finish: No. 3 stainless steel.
 - 3. Size: 18 inches wide by 9 inches high by 25 inches deep.
- D. Performance:
 - 1. Bullet Resistance: UL 752, Level 3.

2.02 BULLET RESISTANT PACKAGE PASS AND FRAME ASSEMBLIES

- A. Basis of Design Manufacturer: Norix Group, Inc.; IPP-150: <https://norix.com>.
- B. Other Acceptable Manufacturers:
 - 1. Chicago Bullet Proof Systems; Bullet Resistant Package Passer, Model CBP with Package Passer Model PP.
 - 2. Fasco Security Products; FPP-700: <https://fascosecurityproducts.com>.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- C. Description:
 - 1. Materials:
 - a. Body: 11 gauge mild steel.
 - b. Doors: 11 gauge stainless steel with bullet resistant polycarbonate window.
 - c. Lock: Stainless steel control rods permitting only one door in the operable position.
 - d. Latch: Paddle latch, zinc plated.
 - e. Finish: All mild steel primed finish.
 - 2. Mounting: 2 inch by 2 inch by 1/8 inch steel angle frame.
 - 3. Size: 18.6 inches high by 18.6 inches wide by 16.3 inches deep.
- D. Performance:
 - 1. Bullet Resistance: UL 752, Level 1 .

2.03 SPEAKING PORT DEVICE

- A. Basis of Design Manufacturer: Norix; Model ISP-100: www.norix.com.
 - 1. Other Acceptable Manufacturers:
 - a. QuickServ Corp: www.quickserv.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description:
 - 1. Materials: Round cast stainless steel talk thru design offers natural voice transmission with evenly spaced louvers.
 - 2. Finish: Brushed stainless steel finish
 - 3. Size: 6 inch diameter.
- C. Performance:
 - 1. Bullet Resistance: UL 752, Level 3.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify that substrates have been properly constructed and prepared.
 - 1. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Surface Preparation:
 - 1. Clean surfaces thoroughly prior to installation.
 - 2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
 - 1. Install in accordance with approved submittals, and UL 752, and in proper relationship with adjacent construction.
- B. Install all equipment plumb, level, rigid and in true alignment.

3.04 TOLERANCES

- A. Maximum Offset From True Alignment: Do not exceed the following installation tolerances.
 - 1. Squareness: Plus or minus 1/16 inch (1.6 mm) measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 - 2. Alignment: Plus or minus 1/16 inch (1.6 mm) measured on jambs on a horizontal line parallel to the plane of the wall
 - 3. Twist: Plus or minus 1/16 inch (1.6 mm) measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.
 - 4. Plumb: Plus or minus 1/16 inch (1.6 mm) measured on the jamb at the floor.

3.05 ADJUSTING

- A. Adjust installed doors for correct function and for smooth operation.

3.06 CLEANING

- A. Clean in accordance with manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.07 CLOSEOUT ACTIVITIES

- A. Demonstrate proper operation of equipment to Owner's designated representative.

3.08 PROTECTION

- A. Protect installed products from subsequent construction operations.

END OF SECTION

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**SECTION 11 1900
DETENTION SURFACE PADDING SYSTEM**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. This Section includes the following:
 - 1. Surface padding system for floors, walls, doors and frames of detention spaces.
 - 2. System shall consist of field-applied MF-SILTEC, covered with bullet resistant Kevlar by DuPont and a protective top coat of high-build liquid vinyl.

1.03 RELATED REQUIREMENTS:

- A. Section 08 3463 - DETENTION DOOR AND FRAMES.
- B. Section 22 4000 - Plumbing Fixtures. Floor toilets and clamping devices. Padded surfaces by B&E will provide waste ring if requested.
- C. Section 23 3700 - Air Outlets and Inlets.
- D. Section 26 5100 - Interior Lighting. Lighting fixtures and fixture lenses.
- E. Section 28 2000 - Video Surveillance. Security wall and ceiling mounted call button stations and security cameras.

1.04 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Provide detention surface padding system which isolates detainees from hard surfaces within the scheduled detention area.
 - 1. Padded surface system shall resist chipping and peeling.
 - 2. Padded surface system shall be easy to clean.
 - 3. Padded surface system shall be water-repellent, impervious to oil, urine and salt.

1.05 QUALITY ASSURANCE

- A. Comply with governing codes and regulations.
- B. Applicator Qualifications: Application shall be performed by an applicator with a minimum of 5 years experience in the successful fabrication and installation of detention surface padding system.
- C. Deliver, handle and store materials in accordance with manufacturer's instructions.
- D. Surface burning characteristics of detention surface system when tested in accordance with UL 723 (ASTM E84) must be equal to or less than:
 - Flame Spread Index 10
 - Fuel Contributed 10
 - Smoke Developed 160
- E. Compression Deflection (ASTM D1056) 4 psi @ 25 % deflection.
- F. Acute Oral Toxicity Test ... Non Toxic
- G. Fungus Resistance (ASTM G21) 0 (Completely resistance)
- H. CSS 12-100-1 Corner Test Pass

1.06 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions. Include methods of installation of surface padding system for each type of substrate to receive padding.

- B. Shop Drawings: Submit shop drawings showing typical method of padding application.
- C. Maintenance Information: Submit, for Owner's use, information regarding the proper care and maintenance of detention surface padding system.

1.07 WARRANTY

- A. Guaranteed impenetrable by organic human body parts for a period of three years from date of manufacturer's installation approval for use. Should penetration occur, the damage will be repaired or the surface replaced at the manufacturer's option.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Basis-of-Design: The design for padded cells is based on product as manufactured by Padded Surfaces by B&E; Telephone: 888-243-8788. Subject to compliance with requirements, provide the named product or a comparable product.

2.02 MATERIALS

- A. Foam Sheets: MF-SILTEC 500.
 - 1. Features
 - a. Nonflammable, nontoxic, and inherently durable
 - b. A nonconductive foam polymer with excellent cushioning, fire blocking, thermal insulating and acoustic/vibration dampening properties
 - c. Structurally resilient with low compression set and 100% memory
 - d. Continuous operating temperature range: -70 to +500 degrees F.
 - e. MFSiltec is odorless, tasteless and non corrosive
 - 2. Specifications:
 - a. ASTM D3674 & ASTM E162 Pass
 - b. UL 94.....V-O
 - c. California Technical Bulletin 117.....Pass
 - d. FMVSS 302.....Pass
 - e. ASTM E662 (Flaming Mode) Ds @ 1.5 min. < 50
 - f. ASTM E662 (Non Flaming Mode).....Ds @ 4 min. < 100
 - g. Bombardier SMP 800-C Pass
 - h. ASTM D573 Pass
 - 3. Compression Set, % ASTM D1056 22 hours @ 100 C...5 %
 - 4. Compression Deflection, psi @ 25 % 4 psi.
 - 5. Tensile Strength, psi 25 psi minimum
 - 6. Elongation, % 60 % minimum
 - 7. Water Absorption, % 10 % maximum
 - 8. Thermal Conductivity k Factor 0.30 (BTU in/hr/ft./F)
- B. Reinforcing Mesh: Kevlar bullet resistant material
 - 1. Tensile Strength (Average) 25,000 psi
 - 2. Elongation at break 10 %
- C. Encapsulate: High-build liquid vinyl of consistency to permit spray or field application.
- D. Color: As selected by Architect.
- E. Adhesive: Type compatible with the materials to be adhered.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions under which detention surface padding system is to be applied. Verify that substrate is in proper condition for installation of system. Do not proceed with

installation until satisfactory conditions have been corrected.

3.02 PREPARATION

- A. Verify that ambient temperatures will be within range required by manufacturer for successful installation and curing of system.
- B. Verify that work of other trades are complete and will not adversely affect curing and protection of detention surface padding system.

3.03 INSTALLATION ON WALLS, FLOORS AND CEILINGS

- A. Cover specified areas with Kev-Koat padded material system.
- B. Apply protective top coat to encapsulate entire padded surface. Color as selected by Architect.
- C. If the application is new construction a sixty day curing time is necessary for the concrete floor maintained for the duration of the construction period and 30 day cure time..
- D. At penetrations of padding system for plumbing fixtures, air diffusers, lighting fixtures and security devices, coordinate with requirements of the respective trades for correct mounting.
- E. A 30-day cure time is required before rooms with detention surface padding can be utilized. Use prior to the 30-day cure time will void the 3 year warranty.

3.04 DOOR PADDING PANEL FABRICATION

- A. Fabricate components to comply with performance and design requirements specified and in accordance with approved shop drawings.
- B. Door padding panels shall be composed of Kev-Koat padded material system adhered to a 3/4" thick fire resistant plywood backing board.
- C. Provide openings for glazed observation openings and food slots.

3.05 CLEANING AND PROTECTION

- A. Touch up damage.
- B. Clean work area of debris associated with installation.
- C. Surface can be cleaned with a mild, non-abrasive liquid detergent.

END OF SECTION

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**SECTION 11 2300
LAUNDRY EQUIPMENT**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SCOPE OF WORK

- A. General: Provide and install all laundry equipment with related items necessary to complete the work shown on the drawings and required by the provisions of this section.
 - 1. The term "install" shall mean the delivery of all laundry equipment complete with transportation charges prepaid to the building, uncrated, set-in-place and properly anchored, where required.
 - 2. Deliver all parts that are to be built into cast-in-place concrete or masonry in ample time for inclusion in the concrete or masonry work. Provide all necessary setting plans and instructions, oversee the installation of all parts in the masonry or concrete and be responsible for the correctness and accuracy of location and installation.
 - 3. Keep premises clean and remove from site all crates, cartons and other debris resulting from work. Leave all areas "broom clean" and equipment "construction clean." Final cleaning of equipment by Laundry Equipment Contractor.

1.03 MECHANICAL AND ELECTRICAL WORK INCLUDED IN LAUNDRY EQUIPMENT WORK

- A. Plumbing:
 - 1. Interplumb laundry equipment between valves, vacuum breakers and equipment connections, and make ready for final connection by Plumbing Contractor.
 - 2. Extend all indirect wastes not connected to the sewage system with black painted pipe. Drain extensions shall drip over and into floor drain. Where drain runs under an item of equipment, provide proper support from bottom of equipment to eliminate interference with the floor cleaning. All horizontal piping to be run at highest possible elevation, not less than six (6") inches above floor, through equipment whenever possible.
- B. Electrical:
 - 1. Interwire laundry equipment between heating elements, switches, starters, thermostats, outlets, motors, and solenoids complete to junction box, terminal box or disconnect switch.
 - 2. Provide and install all switches including disconnect switches within equipment, contactors, combination starters with fused disconnect, controls and similar items necessary for the safe and proper operation of the equipment.
- C. Ventilation:
 - 1. Provide booster fan on runs exceeding sixty (60'-0") feet.
- D. Air Compressors:
 - 1. Provide clearance on all sides for ease of maintenance and air circulation.
 - 2. Bolt or lag to floor and provide with solid shims so that compressors are level. Do not over-tighten bolts or lags that may impose any strain.
 - 3. Provide shut-off valve, air regulator and lubricator for each piece of equipment, as required.

1.04 RELATED WORK SPECIFIED ELSEWHERE (NOT IN THIS SECTION)

- A. Floor depressions indicated on the drawings and where required.
- B. Required holes and recesses for piping and ducts, provided with information as to location and size is provided to other trades in adequate time to be incorporated in the work.

- C. Roughing-in wiring for the laundry equipment and final connection between roughing-in points and points of connection (pigtails or terminals) on the laundry equipment; connections to the equipment shall be in accordance with equipment wiring diagrams.
- D. Extra wall receptacles required for the laundry area.
- E. Required disconnect switches between roughing-in points and points of connection to the equipment.
- F. Providing and installing of traps, strainers and valves, as well as other items provided by the Laundry Equipment Contractor and making final connections to the equipment.
- G. Interconnection of ductwork between Dryers and Lint Collector.
- H. Final connections between the ductwork and the Building Ventilation System.
- I. Roughing-in, providing, and installing all hot and cold water piping between roughing-in points and points of connection on the equipment, providing in each water line a shutoff valve and, where required, a pressure reducer and regulator, and making final connection to the laundry equipment.
- J. Waste piping (excluding extending of indirect waste piping), traps, vents and final connections to drain outlets of laundry equipment.

1.05 SUBMITTALS

- A. Laundry Equipment Contractor shall coordinate submittal due dates with the Construction Schedule for this Project.
- B. Equipment List: Submit for approval within ten (10) days after notification of award of contract, an itemized list of equipment to be provided under the contract with manufacturer's name and model number for each item.
- C. Brochures:
 - 1. Electronically submit complete brochure booklet containing manufacturer's specification catalog pages with all pertinent engineering and dimensional data identified, together with cover pages for each "buy-out" item through proper channels for review, approval, and distribution.
 - 2. Brochure booklet to contain manufacturer's illustration sheet for each manufactured or "buy-out" item, with cover sheet for each item indicating the quantity required, list of accessories required, mechanical and electrical characteristics and other pertinent data.
 - 3. Arrange items in numerical order following scheduled Item Numbers. Brochure booklet shall be complete, covering all manufactured or "buy-out" items of equipment. No consideration will be given to partial submittals made at various times.
- D. Roughing-In or Mechanical Connection Drawings:
 - 1. Prepare and electronically submit computer-generated roughing-in drawings of all equipment shown on Contract Drawings through proper channels for review, approval, and distribution. Prepare drawings at one-quarter (1/4") inch scale on sheet of same size as Contract Drawings showing all the mechanical roughing-in (including sleeves and conduit) for electric, water, waste, ventilation, condensate drain lines, air and exhaust connections and characteristics, and roughing-in data for all services in each area. Indicate the approximate location of the laundry equipment with allowances for traps, switches and other final connection requirements.
 - 2. Dimension each roughing-in location accurately from column center lines and/or walls (not partition walls).

1.06 ASSUME RESPONSIBILITY FOR PROPER LOCATION OF SLEEVES AND CONDUITS THROUGH WHICH THE UTILITY LINES WILL BE INSTALLED AND FOR CONFORMING TO ROUGHING-IN LOCATION WITH THE LAUNDRY EQUIPMENT AND CONNECTIONS THERETO, OR COMPENSATE THE OTHER TRADES FOR ANY NECESSARY RELOCATION OF THE ROUGHING-IN. MAKE FIELD INSPECTION BEFORE THE FINISHED FLOORS ARE LAID AND RELOCATE SLEEVES AS NECESSARY.

A. Field Measurements:

1. Make field measurements giving due consideration to any architectural, mechanical or structural discrepancies which may occur during construction of the building. No extra compensation will be allowed for any difference between actual dimensions and designed dimensions.
2. Submit any differences found during field measurements to the Architect for consideration before proceeding with the installation.

1.07 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

1. National Electric Code (N.E.C.)
2. Underwriters' Laboratories, Inc. (U.L.)
3. Uniform Mechanical Code (U.M.C.)
4. National Electric Manufacturers Association (NEMA)
5. American Society of Mechanical Engineers Register (A.S.M.E.)
6. International Mechanical Code (IMC)
7. International Building Code (IBC)
8. American Gas Association (AGA)
9. National Fuel Gas Code (NFGC)

B. No extra charge will be paid for providing items required by governing codes and regulations, but not specified or shown on drawings.

1.08 GENERAL REQUIREMENTS

A. Electrical: (Check voltage requirements on job before ordering any electrically operated equipment.)

1. All electric units and equipment shall be of voltages indicated. Differences in current characteristics of equipment listed and that available must be submitted to the Architect for consideration before the equipment is ordered.
2. All internal wiring of the equipment to the outlets on the equipment shall be by the Laundry Equipment Contractor in accordance with National Electric Code, and/or jurisdictional governing agencies.
3. All electrically-operated equipment shall conform to the Rules and Regulations and the Laws of the State of the particular installation and shall be approved by the Electrical Inspector or the Underwriters' Laboratories.
4. All electrically-operated manufactured items of equipment shall have Underwriters' Laboratories Approval or U.L. Re-examination listed in every case where such "Approval" has been established for the particular device in question.

B. Gas-Heated Equipment:

1. All gas-fired equipment shall be manufactured and installed in accordance with American Gas Association Requirements and shall carry the AGA Stamp.

C. Building Code Requirements:

1. "Built-in" pieces of equipment shall be installed in strict compliance with the applicable state building codes or the local authority having jurisdiction. This equipment shall also comply with all other applicable codes.

PART 2 PRODUCTS

2.01 STANDARD MANUFACTURED OR "BUY-OUT" EQUIPMENT

- A. Standard laundry equipment made on a production basis is named by catalog number in the Item Specifications and establishes the "Standard" required. Items identified by a manufacturer's model number shall be supplied with all parts and accessories listed by that manufacturer as standard and included in the base price; optional accessory items will be specifically stated in the Item Specifications.
- B. Architect / Consultant shall approve color of equipment, whenever possible.

2.02 NAMEPLATES

- A. Each item of manufactured or "buy-out" equipment provided under this Contract shall be provided with identifying nameplate of corrosion-resistant material giving name and address of manufacturer, catalog and serial numbers, and other identifying information for use in securing replacement parts.
- B. Nameplate shall fit snugly against the surface of the item and shall be free of rough edges.

2.03 WARRANTY AND SERVICE

- A. Provide a listing of factory-authorized service agencies and copies of written Service and Warranty Agreements on all laundry equipment items. Provide written warranty agreeing to replace free of charge any work, equipment, parts, materials and/or workmanship which become defective during the warranty period (except that which becomes defective due to abuse of the equipment). Replacement shall be made without cost to the Owner, and the Laundry Equipment Contractor shall reimburse the other contractors for extra work involved in the replacement of defective equipment. Warranty Period is for one (1) year from date of final acceptance of installation by Owner.

2.04 SUBSTITUTIONS – STANDARDS

- A. The name or make of any article, device, material or form of construction listed in the Item Specifications shall establish the "Standard" required.
- B. Proposals shall be based on the manufacturers and models specified.
- C. Any equipment selected from the "Additional Approved Manufacturers" section must conform to space limitations of the layout and the cost of any deviation will be the responsibility of the Laundry Equipment Contractor at no extra cost to the Owner or other Contractors.
- D. Accepted substitutions will be noted in the Contract and no other substitutions will be permitted subsequent to the signing of the Contract, except by specific change order.

PART 3 EXECUTION

3.01 OPENING – ACCESS

- A. General: Coordinate with other Contractors for provision and scheduling of temporary openings in walls or floors which may be required for passing large sections of equipment into the building that cannot be accommodated through permanent openings.

3.02 INSTALLATION

- A. General: Make arrangements for receiving laundry equipment and make delivery into the building as requisitioned by installation superintendent. Do not consign any equipment to the Owner or to any other contractor without receiving written acceptance from them, and making arrangements for the payment of freight and handling charges.
- B. Deliver all equipment into the building, uncrate, assemble, level and repair any damaged or abraded surfaces. Set equipment temporarily in its final location to permit mechanical trades to take necessary measurements for the connection of the service lines. Move the equipment sufficiently to permit the installation of such service lines and then realign equipment level and

plumb. Install all equipment so as to eliminate objectionable vibration.

- C. Coordinate with Divisions 22, 23 and 26.

3.03 TESTING, DEMONSTRATING, AND INSTRUCTING OWNER'S DESIGNATED PERSONNEL

- A. After complete installation, all items of equipment provided under this Contract shall be operated a minimum of three (3) complete cycles and thoroughly tested to insure proper and safe operation.
- B. The Laundry Equipment Contractor shall arrange to have all mechanically-operated equipment provided under this Contract demonstrated by competent service representative. This representative is to instruct the Owner's designated personnel in the use, care and maintenance of all items of equipment after same are in working order. The Laundry Equipment Contractor shall be present throughout all demonstrations. Equipment shall be fully operational to enable "live" demonstrations.
- C. Quietness of operation of all laundry equipment is a requirement. Laundry Equipment Contractor shall remove or repair all equipment producing excess noise over manufacturer's stated decibel level.

3.04 OPERATING AND MAINTENANCE MANUALS

- A. After completion of the installation, the Laundry Equipment Contractor shall present to the Owner two (2) sets of all Operating and Maintenance Manuals and one (1) Flash Drive covering all mechanically-operated equipment provided under this contract, with the sets being neatly bound in a loose-leaf binder having a durable cover.
- B. Include in the binder the manufacturer, model number, and serial number of all equipment; and a list of names, addresses, and telephone numbers of local service agencies authorized to make necessary repairs and/or adjustments of the equipment provided under this Contract.

3.05 CORRELATION WITH DRAWINGS

- A. This written specification must be closely correlated with the Drawings and Schedules. Each complements the other and cross reference will be necessary to fulfill the requirements of the specifications. All information shown on drawings and listed in schedules shall be incorporated as part of the written specifications.

3.06 SECURITY PACKAGE

- A. All manufacturer's "Buy-Out" equipment shall include "Torx" screws/fasteners and Owner shall be provided with two (2) high quality "Torx" screw drivers.

PART 4 SCHEDULE OF EQUIPMENT

4.01 ITEM NO. L1 – SINK UNIT

ONE REQUIRED

- A. Advance Model FS-2-1818-Modified. All #14-gauge, Type 304 Series stainless-steel construction, complete with one-and-five-eighth (1-5/8") inch diameter stainless-steel legs and one (1") inch, adjustable, stainless-steel bullet feet. Unit shall be modified to be provided with necessary holes to accommodate one (1) faucet per sink bowl. Provide and install Fisher Model 5010, Faucet Assembly, with three (3") spout and Model 2992, Vandal Resistant Kit, (or equal from T&S or Chicago); and chrome-plated, lever-handle, two (2") inch, I.P.S. quick-opening waste with rear outlet connection for chrome-plated brass overflow fitting with one-and-one-quarter (1-1/4") inch brass tubing to be complete assembly as manufactured by Fisher 24902 Series or Component Hardware Model D50-7215 or D10-4591 for each sink bowl.

4.02 LAUNDRY EQUIPMENT CONTRACTOR SHALL EXTEND DRAIN LINES TO FLOOR SINK AND DIRECT DOWNWARD INTO FLOOR SINK.

4.03 ITEM NO. L2 – EYE WASH/FACE WASH STATIO

ONE REQUIRED

- A. T & S Model EW-7360B-TMV. All stainless-steel construction, complete with chrome-plated brass stay open ball valves; one-and-one-quarter (1-1/4") inch diameter waste outlet; and one-

half (1/2") inch water inlet. Provide thermostatic mixing valve inter-plumbed with assembly, all by Laundry Equipment Contractor. Securely attach to building wall at location indicated.

4.04 ITEM NO. L3 – DETERGENT DRUM

FOUR REQUIRED

Not in Laundry Equipment Contract — By Detergent Vendor

4.05 ITEM NO. L4 – WASHER/EXTRACTOR

ONE REQUIRED

Not in Laundry Equipment Contract — Future Purchase

- A. UniMac Model UWT065D30VN. Sixty-five (65) pound capacity, hard mount unit. 480 Volt, three-phase operation. Provide stainless-steel cylinder, tub, and cover panels; 9.7 cubic feet cylinder volume; two (2) main three-quarter (3/4") inch water connections and two (2) three-quarter (3/4") inch spray rinse connections; one (1), three (3") inch drain outlet; programmable microprocessor; variable number of selectable wash speeds from 10-to-50 rpm; four-hundred (400) G-force high extract speed; manually filled five-compartment dry chemical dispensing system; automatic flushing system; forty-eight (48) programmable cycles; thirty (30) programmable water levels; graphic display with words and icons; automatic maintenance reminders; cycle counter; automatic water leak detection system; OPTispray™ Rinsing Technology, UniLinc Software System, and full diagnostic capabilities. All external fasteners shall be replaced with "Torx" tamperproof screws.
- B. Extend drain line to Trench Drain Grating, Item No. L7, and direct downward into trench drain.
- C. Securely attach unit to concrete floor at location indicated on Contract Drawings, as per manufacturer's specific instructions.

4.06 ITEM NO. L5 – WASHER / EXTRACTOR

TWO REQUIRED

- A. UniMac Model UWT065D30VN. Sixty-five (65) pound capacity, hard mount unit. 480 Volt, three-phase operation. Provide stainless-steel cylinder, tub, and cover panels; 9.7 cubic feet cylinder volume; two (2) main three-quarter (3/4") inch water connections and two (2) three-quarter (3/4") inch spray rinse connections; one (1), three (3") inch drain outlet; programmable microprocessor; variable number of selectable wash speeds from 10-to-50 rpm; four-hundred (400) G-force high extract speed; manually filled five-compartment Dry Chemical Dispensing System; automatic Flushing System; forty-eight (48) programmable cycles; thirty (30) programmable water levels; graphic display with words and icons; automatic maintenance reminders; cycle counter; Automatic Water Leak Detection System; OPTispray™ Rinsing Technology, UniLinc Software System, and full diagnostic capabilities. All external fasteners shall be replaced with "Torx" tamperproof screws.
- B. Laundry Equipment Contractor shall extend drain line to Trench Drain Grating, Item No. L7, and direct downward into trench drain.
- C. Laundry Equipment Contractor shall securely attach units to concrete floor at locations indicated on Contract Drawings, as per manufacturer's specific instructions.

4.07 ITEM NO. L6 – WASHER / EXTRACTOR

ONE REQUIRED

- A. UniMac Model UCT030QN0VX. Thirty (30) pound capacity, hard mount unit, with six (6") inch high steel base. 208 Volt, three-phase operation. Provide stainless-steel top, front panel, cylinder, tub, and cover panels; M9, nine-cycle control system; steel base; 4.2 cubic feet wash cylinder volume; two (2), three-quarter (3/4") inch water connections; one (1) three (3") inch drain outlet; programmable microprocessor; three (3) selectable wash speeds; six (6) selectable extract speeds; two-hundred (200) G-force high-extract speed; manually filled four-compartment dry chemical dispensing system; automatic flushing system; nine (9) programmable cycles; three (3) programmable water levels; automatic drain valve; and full diagnostic capabilities. All external fasteners shall be replaced with "Torx" tamper-proof screws.
- B. Laundry Equipment Contractor shall extend drain line to Trench Drain Grating, Item No. L7, and direct downward into trench drain.

- C. Laundry Equipment Contractor shall securely attach unit to concrete floor at location indicated on Contract Drawings, as per manufacturer's specific instructions.

4.08 ITEM NO. L7 – TRENCH DRAIN GRATING WITH LINT FILTER

ONE LOT REQUIRED

- A. Size and shape as shown and required per Contract Drawings. All stainless-steel construction. Grating shall be IKG Industries CM2 close-mesh, stainless-steel type (Type 304 stainless steel), or approved equal. Bearing bars shall be spaced on one-half ($\frac{1}{2}$) inch centers, interspacing to be five-sixteenth ($\frac{5}{16}$) inch. Cross bars spaced on four (4") inch centers. Provide finished edge on all sides of grating. Grating shall be sized, as required, to cover entire length of trench drain. Grating sections shall not exceed thirty-six (36") inches in length and shall be secured to floor utilizing stainless-steel fasteners with "Torx" heads.
- B. When installed, grating insert shall be flush and level with surrounding laundry floor. Top and bottom surfaces of grating shall be ground smooth and polished to remove burrs, imperfections, etc.
- C. Provide and install J. R. Smith Manufacturing Company stainless-steel filter screen. Note filter screen shall be provided with stainless-steel flange to enable securing to concrete floor within trough in advance of drain. Trough shall be provided with primary stainless-steel filter screen, with five-eighth ($\frac{5}{8}$) inch perforated holes and secondary stainless-steel filter screen with one-quarter ($\frac{1}{4}$) inch perforated holes. Screens shall be removable for cleaning and measure approximately 24" long x 6" high to fit within interior of trough, providing necessary clearance for trough grating.

4.09 ITEM NO. L8 – DRYER

ONE REQUIRED

- A. UniMac Model UT035NDN0RBC. Thirty-five (35) pound capacity. Natural gas. 120 Volt, single-phase operation for controls and fan motors. Provide 12.3 cubic feet cylinder volume; automatic reversing cylinder; white exterior finish; glass door hinged left; UniLinc System; self-cleaning lint filter; OPTidry Over-dry Prevention Technology; C.A.R.E.™ (Fire Suppression System); cart bumper, and kickplate. All external fasteners shall be replaced with "Torx" tamper-proof screws.
- B. HVAC System Contractor shall provide and extend ductwork from Dryer to Lint Collector with Airflow Optimizer, Item No. L11. Laundry Equipment Contractor shall fully coordinate.
- C. Laundry Equipment Contractor shall provide and install #16-gauge stainless-steel trim between building walls and top of this dryer and abutting Dryers, Items No. L9, to completely encase opening and provide a finished appearance. Trim shall be secured with "Torx" tamperproof fasteners.

4.10 ITEM NO. L9 – DRYER

TWO REQUIRED

- A. UniMac Model UTF75NDN0RNC. Seventy-five (75) pound capacity. Natural gas. 480 Volt, three-phase operation. Provide 22.4 cubic feet cylinder volume; automatic reversing cylinder; white exterior finish; glass door hinged left; Fast-dry Technology; UniLinc System; self-cleaning lint filter; OPTidry Over-dry Prevention Technology; C.A.R.E.™ (Fire Suppression System); cart bumper and kickplate. All external fasteners shall be replaced with "Torx" tamper-proof screws.
- B. HVAC System Contractor shall provide and extend ductwork from Dryers to Lint Collector with Airflow Optimizer, Item No. L11. Laundry Equipment Contractor shall fully coordinate.
- C. Laundry Equipment Contractor shall provide and install #16-gauge stainless-steel trim between building walls and top of these units and abutting Dryer, Item No. L8, to completely encase opening and provide a finished appearance. Trim shall be secured with "Torx" tamperproof fasteners.

4.11 ITEM NO. L10 – DRYER

ONE REQUIRED

Not in Laundry Equipment Contract — Future Purchase

- A. UniMac Model UTF75NDN0RNC. Seventy-five (75) pound capacity. Natural gas. 480 Volt, three-phase operation. Provide 22.4 cubic feet cylinder volume; automatic reversing cylinder; white exterior finish; glass door hinged left; Fast-dry Technology; UniLinc System; self-cleaning lint filter; OPTidry Over-dry Prevention Technology; C.A.R.E.™ (Fire Suppression System); cart bumper and kickplate. All external fasteners shall be replaced with "Torx" tamper-proof screws.
- B. Extend ductwork from Dryer to Lint Collector with Airflow Optimizer, Item No. L11.

4.12 ITEM NO. L11 – LINT COLLECTOR WITH AIRFLOW OPTIMIZER

ONE REQUIRED

- A. Energenics In-Line Space Saver Lint Filter Model S-6. Dryer Exhausts, Items No. L8, No. L9, and No. L10, shall be equipped with an automatically-cleaned, in-line, single-stage, dry lint filter, with the following capacity and construction:
 - 1. Filter shall be sized to clean up to 6,000 Cfm exhaust air with a measured resistance when clean of 0.3" water column static pressure measured in the lint outlet of the filter. Body of filter shall be constructed of stainless steel. Filter must be assembled and equipped for suspension indoors. Filter must be constructed to be internally accessible for service and replacement of parts without removal from the piping system.
- B. Filter media shall be either polyester monofilament fabric or stainless-steel cloth capable of removing 98% of all particles larger than 210 microns and collecting over 99% of the lint (by weight). Filter screens must have surface area of not less than eighteen (18) square feet.
- C. Filter controls shall be 24 VAC controlled, designed to meet all national, state, and city safety codes. Controlled system shall include a U.L. Listed, 120/24 VAC transformer, an approved dust-proof enclosure, a hard-wired logic system to measure, coordinate and control the automatic blow-down function complete with adjustable off-delay and on-delay periods, the fire protection system with audible and visual alarms, the static pressure control system including both mid-cycle and heat-cycle shutdown capability and shall include a manual blowdown switch.
- D. Unit shall be installed forty (40") inches above finished floor (to bottom of lint drop), so bottom of lint drop provides ground clearance to accommodate a standard fifty-five (55) gallon drum. Filter shall be provided with tapered flexible connector to fit into a standard fifty-five (55) gallon drum.
- E. Unit shall include Fire Control System and Excess Back Pressure Alarm System.
- F. Laundry Equipment Contractor shall fully interconnect controls between Lint Collector and Dryers.
- G. Laundry Equipment Contractor shall completely interconnect controls between Airflow Optimizer, Lint Collector, and Dryers, Items No. L8 and No. L9, and extend to exterior of building as required.
- H. HVAC System Contractor shall completely interconnect all ductwork between Dryers, Items No. L8 and No. L9, and Lint Collector and extend to exterior of building, as required.
- I. Laundry Equipment Contractor shall provide and fully interconnect compressed air line, complete with a one (1") inch air-solenoid valve between Lint Collector with Air Compressor with vertical tank, Item No. L12, complete with drip leg at bottom of each riser. Provide filter and isolation valve on compressed air line.
- J. Provide and install Energenics fully automatic airflow optimizer, complete with tube axial fan, of proper size and capacity within ductwork to accommodate Dryers, Items No. 8 and No. L9. 208 Volt, three-phase operation. Unit shall measure back pressure and continually balance system to provide an efficient operation. Interconnect with axial fan by Laundry Equipment Contractor. Laundry Equipment Contractor shall fully interconnect controls between Airflow Optimizer, Lint Collector, and Dryers.

4.13 ITEM NO. L12 – AIR COMPRESSOR WITH VERTICAL TANK**ONE REQUIRED**

- A. Ingersoll Rand Model 2340 L5-V. Sixty (60) gallon vertical tank shall be rated at 5-horsepower and wired for 208 volt, three-phase operation.
- B. Receiving tank shall be interconnected to Dryers, Items No. L8 and No. L9, and Lint Collector with Airflow Optimizer, Item No. L11, by Laundry Equipment Contractor, as indicated on Contract Drawings.
- C. Unit shall be securely attached to building floor to prohibit movement due to vibration.
- D. Laundry Equipment Contractor shall verify and coordinate door opening requirement in Lint Room to accommodate installation and future removal of unit.

4.14 ITEM NO. L13 – LINT COLLECTING DRUM**TWO REQUIRED**

Not in Laundry Equipment Contract — By Owner

- A. Utilize standard fifty-five (55) gallon drums to accommodate forty (40") inches high ground clearance of bottom of lint drop of Lint Collector, Item No. L11.

4.15 ITEM NO. L14 – FOLDING TABLE**TWO REQUIRED**

- A. Size and shape as required and as shown on Contract Drawings. Table shall be constructed of all #14-gauge stainless steel, with top stud-bolted to counter frame on 2'-6" centers to channel bracing. Provide chrome-plated acorn cap nuts. Provide #16-gauge stainless-steel undershelf fully welded to table legs and provided with #14-gauge stainless steel channel centered full-length of underside of undershelf. Note table top shall be provided with #14-gauge stainless steel, 1" x 4" x 1" stainless-steel channels attached in the "legs down" position. Leg sockets shall be cylindrical, one-piece stainless-steel construction, welded to supporting members and secured to legs via Allen set screw. Construction shall be #18-gauge stainless steel matching design of Component Hardware Model A20-0206. Legs shall be one-and-five-eighth (1-5/8") inch outer-diameter, #16-gauge stainless steel tubing fitted with Component Hardware Model A10-0854 and stainless steel foot flange. Flanged feet shall be secured to building floor by Laundry Equipment Contractor to prohibit movement of table. Laundry Equipment Contractor shall verify exact placement with Owner prior to securing.

4.16 ITEM NO. L15 – FOLDING TABLE**ONE REQUIRED**

Not in Laundry Equipment Contract — Future Purchase

- A. Size and shape as required and as shown on Contract Drawings. Table shall be constructed of all #14-gauge stainless steel, with top stud-bolted to counter frame on 2'-6" centers to channel bracing. Provide chrome-plated acorn cap nuts. Provide #16-gauge stainless-steel undershelf fully welded to table legs and provided with #14-gauge stainless steel channel centered full-length of underside of undershelf. Note table top shall be provided with #14-gauge stainless steel, 1" x 4" x 1" stainless-steel channels attached in the "legs down" position. Leg sockets shall be cylindrical, one-piece stainless-steel construction, welded to supporting members and secured to legs via Allen set screw. Construction shall be #18-gauge stainless steel matching design of Component Hardware Model A20-0206. Legs shall be one-and-five-eighth (1-5/8") inch outer-diameter, #16-gauge stainless steel tubing fitted with Component Hardware Model A10-0854 and stainless steel foot flange. Flanged feet shall be secured to building floor by Laundry Equipment Contractor to prohibit movement of table. Verify exact placement with Owner prior to securing.

4.17 ITEM NO. L16 – LAUNDRY BIN**SIX REQUIRED**

- A. McClure Industries, Incorporated, Sanitrix Model 440-16. Sixteen (16) bushel capacity. Unit shall be constructed of fire-retardant fiberglass composite and include reinforced bottom; full bumper; and four (4), five (5") inch diameter, heavy-duty casters mounted with stainless-steel bolts, all four (4) swivel. Standard color or colors, as selected by Owner.

4.18 ITEM NO. L17 – LAUNDRY BIN**THREE REQUIRED**

Not in Laundry Equipment Contract — Future Purchase

- A. McClure Industries, Incorporated, Sanitru Model 440-16. Sixteen (16) bushel capacity. Unit shall be constructed of fire-retardant fiberglass composite and include reinforced bottom; full bumper; and four (4), five (5") inch diameter, heavy-duty casters mounted with stainless-steel bolts, all four (4) swivel. Standard color or colors, as selected by Owner.

4.19 ITEM NO. 18 – SHELVING**FOURTEEN REQUIRED**

- A. New Age all-welded bar style shelving unit, with weight capacity of 1,500 pounds per shelf, with minimum 1-1/2" x 1-1/2" x .070" posts and shelves with adjustable feet. Provide the following complete units:

1. Five (5) Model 1071, 42" long x 24" wide x 72" high, four-shelf units.
2. Nine (9) Model 1066, 48" long x 24" wide x 72" high, four-shelf units.

4.20 ITEM NO. 19 – SHELVING**FOUR REQUIRED**

Not in Laundry Equipment Contract — Future Purchase

- A. New Age all-welded bar style shelving unit, with weight capacity of 1,500 pounds per shelf, with minimum 1-1/2" x 1-1/2" x .070" posts and shelves with adjustable feet. Provide the following complete units:

1. Four (4) Model 1071, 42" long x 24" wide x 72" high, four-shelf units.

4.21 ITEM NO. L20 – JANITOR'S SINK**ONE REQUIRED**

Not in Laundry Equipment Contract — By Plumbing Contractor

4.22 ITEM NO. L21 – HOSE FAUCET**ONE REQUIRED**

Not in Laundry Equipment Contract — By Plumbing Contractor

ADDITIONAL ACCEPTABLE MANUFACTURERS

The following listed manufacturers may be considered as acceptable alternates; however, the specified manufacturer's make and model number establishes the minimum required standards. All equipment, capacities, warranties, and specific accessories specified within the named manufacturer's make and model number must be provided with the following listed manufacturers. All additional costs incurred in order to provide the above-mentioned equipment and warranties shall be considered a part of this specification.

ITEM NO. L1 – EAGLE, FABRICATED

ITEM NO. L2 – BRADLEY, ENCON

ITEM NO. L3 – NOT IN LAUNDRY EQUIPMENT CONTRACT

ITEM NO. L4 – NOT IN LAUNDRY EQUIPMENT CONTRACT

ITEM NO. L5 – MILNOR

ITEM NO. L6 – MILNOR

ITEM NO. L7 – FABRICATED

ITEM NO. L8 – MILNOR, AMERICAN DRYER

ITEM NO. L9 – MILNOR, AMERICAN DRYER

ITEM NO. L10 – NOT IN LAUNDRY EQUIPMENT CONTRACT

ITEM NO. L11 – NO ALTERNATE

ITEM NO. L12 – ROLAIR, KELLOGG AMERICAN
ITEM NO. L13 – NOT IN LAUNDRY EQUIPMENT CONTRACT
ITEM NO. L14 – FABRICATED
ITEM NO. L15 – NOT IN LAUNDRY EQUIPMENT CONTRACT
ITEM NO. L16 – MEESE
ITEM NO. L17 – NOT IN LAUNDRY EQUIPMENT CONTRACT
ITEM NO. L18 – CHANNEL
ITEM NO. L19 – NOT IN LAUNDRY EQUIPMENT CONTRACT
ITEM NO. L20 – NOT IN LAUNDRY EQUIPMENT CONTRACT
ITEM NO. L21 – NOT IN LAUNDRY EQUIPMENT CONTRACT

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**SECTION 11 4000
FOOD SERVICE EQUIPMENT**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SCOPE OF WORK

- A. General: Provide and install all food service equipment with related items necessary to complete the work shown on the drawings and required by the provisions of this section.
1. The term "install" shall mean the delivery of all food service equipment complete with transportation charges prepaid to the building, uncrated, set-in-place and properly anchored, where required.
 2. Deliver all parts that are to be built into cast-in-place concrete or masonry in ample time for inclusion in the concrete or masonry work. Provide all necessary setting plans and instructions, oversee the installation of all parts in the masonry or concrete, and be responsible for the correctness and accuracy of location and installation.
 3. Cut holes and ferrules on equipment for pipes, drains, electric outlets, conduits and similar items, as required, coordinating the installation of the food service equipment with the work of other Contractors.
 4. Keep premises clean and remove from site all crates, cartons, and other debris resulting from work. Leave all areas "broom clean" throughout construction and final clean prior to turning over to Owner. Final sanitizing of equipment by Owner.
 5. Field check building measurements.

1.03 MECHANICAL AND ELECTRICAL WORK INCLUDED IN FOOD SERVICE EQUIPMENT WORK

- A. Plumbing:
1. Interplumb food service equipment between valves, vacuum breakers, and equipment connections, and make ready for final connection by Plumbing Contractor. All exposed plumbing shall be silver-painted copper piping, except where noted.
 2. Provide and install all chrome-plated faucets and hose reels specified for sinks and other equipment. Provide all backsplash-mounted faucets with double-male nipples having locknuts for rigidly securing faucets to backsplash.
 3. Provide and install all copper wastes incorporated in the custom-fabricated food service equipment, complete with silver-painted copper tailpiece.
 4. Extend all indirect wastes not connected to the sewage system with copper piping, silver-painted. Drain extensions shall drip over and into floor drain. Where drain runs under an item of equipment, provide proper support from bottom of equipment to eliminate interference with the floor cleaning.
 5. Provide gas-pressure regulators on the individual pieces of gas-fired equipment per manufacturer's recommendation.
- B. Electrical:
1. Interwire food service equipment between heating elements, switches, starters, thermostats, outlets, motors and solenoids complete to junction box, terminal box or disconnect switch.
 2. Provide and install all switches, including disconnect switches within equipment, contactors, combination starters with fused disconnect, controls and similar items necessary for the safe and proper operation of the equipment.
 3. Provide all electrically-operated portable or movable equipment with three-wire or four-wire, heavy-duty rubber cord fitted with grounded plug with one (1) leg of the cord grounded to frame of equipment.

4. Provide and install grounded receptacles specified under Item Specifications and/or shown as part of the item of equipment, including stainless-steel faceplate.
 5. Provide and install electric thermostats, where required; Robertshaw, or approved equal, unless otherwise specified.
- C. Refrigeration:
1. Provide, install, and thoroughly test refrigeration systems furnished as part of the food service equipment. (See Paragraph "Warranty and Service" for general specifications covering refrigeration systems and service contracts for same.)
- D. Heating and Ventilation:
1. Provide and install #18-gauge stainless-steel vent ducts from vent collars in top of dishwasher to six (6") inches above finished ceiling. Provide dampers, where required.
 2. Provide and install Fire Extinguishing Systems as required by National Fire Protection Association, Current Edition, and as specified.

1.04 RELATED WORK SPECIFIED ELSEWHERE: (NOT IN THIS SECTION)

- A. Floor depressions indicated on the drawings and where required.
- B. Finished floor and sub-floor requirements for walk-in refrigerator and freezer.
- C. Required holes and recesses for piping and ducts provided with information as to location and size is furnished to other trades in adequate time to be incorporated in the work.
- D. Roughing-in wiring for the food service equipment and final connection between roughing-in points and points of connection (pigtails or terminals) on the food service equipment; connections to the equipment shall be in accordance with equipment wiring diagrams.
- E. Wall receptacles shown and required for the food service equipment.
- F. Required disconnect switches between roughing-in points and points of connection to the equipment.
- G. Providing and installing traps, strainers, and valves, including items furnished by the Food Service Equipment Contractor, and making final connections to the food service equipment.
- H. Final connections between the vent collars in top of the ventilators over the cooking and baking equipment and the building ventilation system.
- I. Final connections between the vent ducts off dishwasher, these ducts being extended six (6") inches above the finished ceiling by the Food Service Equipment Contractor.
- J. Roughing-in, providing, and installing all hot and cold water piping between roughing-in points and points of connection on the equipment, providing in each water line a shut-off valve and, where required, a pressure reducer and regulator, and making final connection to the Food Service Equipment.
- K. Installation of the final connection to faucets and hose reels provided by the Food Service Equipment Contractor on sinks, tables, and other equipment.
- L. Waste piping (excluding extending of indirect waste piping), traps, vents, and final connections to drain outlets of sinks and other equipment.

1.05 SUBMITTALS

- A. Food Service Contractor shall coordinate Submittal Due Dates with the Construction Schedule for this project.
- B. Equipment List: Submit for approval within ten (10) days after notification of award of contract an itemized list of equipment to be provided under the contract, with manufacturer's name and model number for each item.
- C. Samples: Upon the request of the Architect, submit for approval all hardware, drawer slides, drawers, feet, casters, brackets, and similar items, including samples of construction showing

typical reinforcement of underside of tops, as well as angle framing of counters.

D. Brochures:

1. Electronically submit complete brochure booklet containing manufacturer's specification catalog pages with all pertinent engineering and dimensional data identified, together with cover pages for each "buy-out" item to the Architect and Food Service Consultant for review, approval, and distribution.
2. Brochure booklet to contain manufacturer's illustration sheet for each manufactured or "buy-out" item, with cover sheet for each item indicating the quantity required, list of accessories required, electrical characteristics, and other pertinent data.
3. Arrange items in numerical order following scheduled Item Numbers. Brochure booklet shall be complete, covering all manufactured or "buy-out" items of equipment. No consideration will be given to partial lists made at various times.

E. Roughing-In or Mechanical Connection Drawings:

1. Electronically submit drawings to the Architect and Food Service Consultant for review, approval and distribution.
2. Prepare roughing-in drawings of all equipment shown on Contract drawings (this includes new equipment supplied as a part of the Contract, as well as any existing equipment to be reused). Prepare AutoCAD-generated drawings at one-quarter (1/4") inch scale on sheet of same size as Contract Drawings showing all the mechanical roughing-in (including sleeves and conduit) for electric, water, waste, gas, refrigeration, ventilation, condensate drain lines, air and exhaust connections and characteristics, and roughing-in data for all services in each area. Indicate the approximate location of the food service equipment with allowances for traps, switches and other final connection requirements.
3. Dimension each roughing-in location accurately from column centerlines and/or walls (not partition walls).
4. Assume responsibility for proper location of sleeves and conduits through which the utility lines will be installed and for conforming to roughing-in location with the food service equipment and connections thereto, or compensate the other trades for any necessary relocation of the roughing-in. Make field inspection before the finished floors are laid and relocate sleeves, as necessary.

F. Shop Drawings or Custom-Fabricated Equipment.

1. Electronically submit drawings to the Architect and Food Service Consultant for review, approval, and distribution.
2. Prepare computer-generated shop drawings at three-quarter (3/4") inch scale, or larger, on sheets of same size as Contract Drawings indicating all dimensions, details for construction, reinforcement and for installation and relation to adjoining work that requires cutting and close-fitting. Obtain written permission from the Architect, before fabrication, for any departure from construction indicated, or required, which may be necessary due to special conditions found at the building.
3. Do not fabricate custom-manufactured equipment until final approvals are received on shop drawings and until field inspection and measurements are taken.

G. Field Measurements:

1. Make field measurements giving due consideration to any architectural, mechanical or structural discrepancies that may occur during construction of the building. No extra compensation will be allowed for any difference between actual dimensions and designed dimensions.

H. Submit any differences found during field measurements to the Architect for consideration before proceeding with the fabrication.

1.06 STANDARDS

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - 1. National Fire Protection Association (NFPA)
 - NFPA 96 – Installation of Equipment for Removal of Smoke and Grease-laden Vapors from Commercial Cooking Equipment, Current Edition.
 - NFPA 17A – Wet Chemical Extinguishing Systems, Current Edition
 - 2. National Sanitation Foundation (NSF)
 - 3. Underwriters' Laboratories, Inc. (U.L.)
 - 4. National Electric Manufacturers Association (NEMA)
 - 5. National Electric Code (NEC)
 - 6. American Gas Association (AGA)
- B. National Fuel Gas Code (NFGC)
 - 1. International Mechanical Code (IMC)
 - 2. International Building Code (IBC)

1.07 GENERAL REQUIREMENTS

- A. Electrical: (Check voltage requirements on job before ordering any electrically-operated equipment.)
 - 1. All electric units and equipment shall be of voltages indicated. Differences in current characteristics of equipment listed and that available must be submitted to the Architect for consideration before the equipment is ordered.
 - 2. All internal wiring of the equipment to the outlets on the equipment shall be by the Food Service Equipment Contractor in accordance with National Electric Code and/or jurisdictional governing agencies.
 - 3. All electrically-operated equipment shall conform to the Rules and Regulations and the Laws of the State of the particular installation and shall be approved by the Electrical Inspector or the Underwriters' Laboratories.
 - 4. All electrically-operated assemblies of fabricated equipment shall have Underwriters' Laboratories Approval where such Approval has been established.
 - 5. All electrically-operated manufactured items of equipment shall have Underwriters' Laboratories Approval or U.L. Re-examination listed in every case where such Approval has been established for the particular device in question.
- B. Steam Heated or Steam Operated Equipment:
 - 1. All steam-heated or steam-operated equipment shall be manufactured in accordance with ASME Code Requirements and shall carry the ASME Stamp.
- C. Sanitary Requirements:
 - 1. All food service equipment provided and installed shall conform to the Standards of National Sanitation Foundation, Ann Arbor, Michigan, (where "Standards" have been established) to the Rules and Regulations of the State Board of Health and the local Board of Health. All equipment covered by NSF Standards shall bear its Seal.
- D. Gas-Heated Equipment:
 - 1. All gas-fired equipment shall be manufactured and installed in accordance with American Gas Association Requirements and shall carry the AGA Stamp.
- E. Ventilation Equipment:
 - 1. Cooking Equipment Ventilation Systems shall be designed, fabricated, and installed in strict compliance with the National Fire Protection Association, Current Edition, and International Mechanical Code, Section 507, and all associated State and Local Code Standards.

- F. Building Code Requirements
1. Walk-In Refrigerator and Freezer Rooms and other "built-in" pieces of equipment shall be designed, fabricated, and installed in strict compliance with the applicable State Building Codes or the local authority having jurisdiction. This equipment shall also comply with all other applicable Codes.

1.08 CONTRACTOR QUALIFICATIONS

- A. Food Service Equipment Contractor shall have been in business at least five (5) years with a suitable organization to procure, deliver, and install the equipment, all in accordance with specified conditions, and shall be able to refer to other successful installations of similar equipment and size to that specified herein and which have proven satisfactory under similar operating conditions. Under no condition shall this Contractor sublet any portion of the project to any subcontractor without Architect's approval.
- B. All labor shall be performed by experienced mechanics in this kind of work. All work on the premises shall be done at such time as to promote the proper conduct of the project. Provide a competent superintendent to supervise the installation of equipment and to give to other trades such information necessary for the proper conduct and completion of this installation.

PART 2 PRODUCTS

2.01 STANDARD MANUFACTURED OR "BUY-OUT" EQUIPMENT

- A. Standard food service equipment made on a production basis is named by catalog number in the Item Specifications and establishes the "Standard" required. Items identified by a manufacturer's model number shall be supplied with all parts and accessories listed by that manufacturer as "Standard" and included in the base price; optional accessory items will be specifically stated in the Item Specifications.

2.02 NAMEPLATES

- A. Each item of manufactured or "buy-out" equipment furnished under this contract shall be provided with identifying nameplate of corrosion-resistant material giving name and address of manufacturer, catalog and serial numbers, and other identifying information for use in securing replacement parts.
- B. Nameplate shall fit snugly against the surface of the item, shall be free of rough edges, and shall be attached in such manner as not to interfere with the cleaning of the equipment.

2.03 MOTORS

- A. All electric motors and operating controls shall be splash-proof and conform to the available electrical characteristics on the premises. All fractional horsepower motors under 1/2-horsepower shall be supplied to operate on 120 volt, 60 cycle, single-phase current. All 1/2-horsepower and over shall be supplied to operate on the power circuit, three-phase current or as otherwise specified.

2.04 HEATING EQUIPMENT

- A. All electrical heating units shall be provided with an "On/Off" switch, ruby light indicator, U.L. Approved wiring, grounded, and prewired by this Contractor to a connection box ready for final connection by other trades.

2.05 WARRANTY AND SERVICE

- A. Provide a listing of factory-authorized service agencies and copies of written service and warranty agreements on all food service equipment items. Provide written Warranty agreeing to replace free of charge any work, equipment, parts, materials and/or workmanship that become defective during the Warranty Period (except that which becomes defective due to abuse of the equipment). Replacement shall be made without cost to the Owner. The Food Service Equipment Contractor shall reimburse the other contractors for extra work involved in

the replacement of defective equipment. Warranty Period is for one (1) year from date equipment is put into continuous operation and accepted by the Owner.

- B. All Refrigeration Systems shall be provided with a One (1) Year Prepaid Service Contract and a Five (5) Year Warranty on the compressor. Warranty to begin at time when equipment is put into continuous operation and accepted by the Owner.
- C. Service Contracts on Refrigeration Systems must be contracted for by the Food Service Equipment Contractor with authorized local service organizations capable of providing prompt and efficient service on the equipment. Submit copies of all Service Contracts to the Architect upon completion of the installation of the food service equipment.

2.06 SUBSTITUTIONS – STANDARDS

- A. The name or make of any article, device, material, or form of construction listed in the Item Specifications shall establish the "Standard" required.
- B. Proposals shall be based on the manufacturers and models specified; however, bidders may submit prices of other manufacturers identified on the "Additional Acceptable Manufacturers" listing at the end of this section, with the understanding the specified manufacturer and model number establishes the minimum standards required.
- C. Any equipment selected from the "Additional Acceptable Manufacturers" listing must conform to space limitations of the layout and the cost of any deviation will be the responsibility of the Food Service Equipment Contractor at no extra cost to the Owner or other Contractors.
- D. Accepted "Alternates" will be noted in the Contract and no other substitutions will be permitted subsequent to the signing of the Contract, except by specific change order.

2.07 CUSTOM FABRICATED EQUIPMENT

- A. Custom fabricated equipment shall be constructed in strict accordance with the Contract Drawings and be the best grade manufacture of one of the following pre-approved food service equipment custom-fabricators: Bova Corporation, P.O. Box 118, 111 McFann Road, Valencia, PA 16059; Keystone Custom Fabricators, Inc., 108 Atlantic Avenue, Elizabeth, PA 15037; and Commercial Stainless, Inc., 900 Patterson Drive, Bloomsburg, PA 17815. This discipline shall have been in continuous business for a minimum of five (5) years and successfully completed projects of similar size and scope.
- B. Products must conform to the requirements of the plans and specifications established as the "Standard" required.

2.08 MATERIALS – METAL

- A. All materials shall be new, of prime quality, full-gauge thickness of composition indicated by name or abbreviations used in Item Specifications.
- B. All gauges herein specified shall be standard U.S. gauges. Unless specified, no material shall be provided lighter than #18-gauge.
- C. Whenever galvanized iron and/or galvanized sheets are specified, or required, it shall be an approved grade of copper-bearing steel as manufactured by Armco, or equal. Wherever galvanized angles or channels are specified, these shall be of copper-bearing steel as specified for sheets. All fabricated edges of sheets or angles shall be protected by a special metalizing process to give all fabricated edges and surfaces equal protection to the finished surfaces.
- D. Where stainless steel is specified, sheets, castings or tubing shall be Type 304 of the 18-8 Series, with a content of from 17% to 19% chrome, 7% to 10% nickel and a maximum carbon content of .09. All exposed stainless-steel surfaces shall be a No. 4 mill finish. An exposed surface shall be interpreted to include inside surfaces exposed to view when any door is opened.

- E. All unexposed portions shall be ground smooth with either a #80-grit finish or a first cut commercial finish.
- F. Tubing shall be #16-gauge stainless steel, (.065) thick, seamless drawn or shall have seam welded continuously, ground smooth and polished.
- G. Color of equipment of any nature: As selected by the Architect from laminate manufacturer's full range of colors/finishes.

2.09 GENERAL DETAILS FOR THE CONSTRUCTION OF CUSTOM-FABRICATED EQUIPMENT

A. Joints and Welds:

- 1. All equipment herein specified, when constructed of more than one (1) piece and/or sheet of metal shall be continuously butt-welded, ground and polished smooth. Field joints shall be as few as possible. All welded parts shall be homogeneous, non-porous, free-from-pits, cracks, imperfections or discolorations. All welding shall be electric process, with all joints ground and polished smooth. The welding rods used shall be of the same composition as sheets of parts welded.

B. Tops:

- 1. All table tops, counters and like items, unless otherwise specified, shall be of #14-gauge stainless steel of one (1) sheet without seams with edges as indicated on detail drawings.
- 2. Tops shall be stud-bolted to counter frames on 2'-6" centers and to channel bracing of "open" fixtures. Provide chrome-plated acorn cap nuts.
- 3. Field joints in tops shall be welded, ground smooth, and polished only where tops exceed length of available sheets and/or where building accesses do not permit the top to be brought into the building in one (1) piece.

C. Channels:

- 1. All channels shall be of #14-gauge stainless-steel construction, 1" x 4" x 1", edges ground and polished. Channel shall be attached to table tops, counters and like items in "legs down" position. Full perimeter shall be sealed to table top with clear silicone mastic sealant, Component Hardware M90-1010. Channels shall run front-to-back at each leg location with additional channel bracing running between front-to-back channels, down the center of the fixture. Where channels intersect, they shall be fully welded, ground and polished. Where an item of food service equipment is to be placed on a work table or counter, provide additional channel bracing to accommodate the weight and operation of the equipment items.

D. Sound Deadening:

- 1. Apply 3M Company, #Y434 W/L, two (2") inch wide, aluminum foil tape to the underside of all table and counter tops, spaced on eight (8") inch centers.

E. Sinks:

- 1. All sinks shall be constructed of #14-gauge stainless steel, with all corners formed with a three-quarter (3/4") inch radius, both horizontal and vertical. All sink sizes established on the Detail Drawings to be inside measurements.
- 2. Partitions between sink compartments shall be double-walled with three-quarter (3/4") inch radius corners and three-quarter (3/4") inch radius top edges welded-in-place, ground smooth and polished. Fronts, bottoms and back of multiple-compartment sinks shall be one (1) piece, with no overlapping joints or open crevices. Bottom of each compartment shall be creased to center and fitted with lever-operated waste with strainer plate and a brass tailpiece for slip connection. Lever waste to be set into one-half (1/2") inch deep recess, assuring complete draining. Overflow shall be fitted in back of sink so that the constant water level is one (1") inch below sink rim and/or adjoining drainboard level and shall be factory-installed.

3. Where sinks occur in tables, they shall be entirely welded to the table top with all welds ground smooth and polished with no trace of welding left, all to give the appearance of one (1) continuous piece.
 4. Sinks are to have a stainless-steel backsplash, where required, of the height specified.
 5. Provide two (2) holes for specified faucets.
- F. Drainboards and Dish Tables:
1. All drainboards shall be constructed of #14-gauge stainless steel. Turn front and ends up three (3") inches and finish with one-and-one-half (1-1/2") inch, 180-degree roll. All corners, both horizontal and vertical, shall have standard three-quarter (3/4") inch radius. Exterior corners shall be rounded. Weld drainboards to sink forming an integral unit.

2.10 PITCH AND DRAINAGE:

1. Wherever a fixture is used with a waste or drain outlet, the surface shall have a distinct pitch toward such an outlet. Dish tables and drainboards shall have a definite pitch to drain. Pitch to be accomplished on table top only.
 2. Where drains are called for to be located in long tables or where drainage is necessary, such table tops shall be provided with drains located at specific points as shown on the drawings.
- B. Faucets and Wastes:
1. All plumbing fixtures shall be ANSI/NSF 61 Section 9 Certified, CSA Certified, and EPA Act 2005 Compliant. Faucets shall be provided with stainless-steel seats and two-part swivel stem assemblies, lever handles, and chrome-plated ADA easy-turn stems.
 2. Provide all faucet's lever-handle, quick-opening wastes with overflow assemblies, basket wastes, straight wastes and valves normally supplied with equipment for proper operation of a particular item. Sink mixing faucets are to be Fisher Model 5010 with three (3") inch spout and Model 2992, Vandal Resistant Kit, or equal from T&S or Chicago.
 3. Wall-type faucet with integral stops, Fisher 5010 Series, combination sink fitting, less soap dish, complete with R integral stop supply arms and with three (3") inch spout attached to backsplash with one-half (1/2") inch close nipple and one-half (1/2") inch copper to flange sink ell.
 4. Chrome-plated, lever-handle, two (2") inch, I.P.S. quick-opening waste with rear outlet connection for chrome-plated brass overflow fitting with one-and-one-quarter (1-1/4") inch brass tubing to be complete assembly as manufactured by Fisher 24902 Series or Component Hardware Model D50-7215 or D10-4591.
- C. Enclosed Cabinets
1. Construct all enclosed bases, cabinets and wall cabinets and the like of #18-gauge stainless-steel, single-wall, pan-type, completely one (1) piece welded construction with no visible joints or screw attachments showing. Entire unit to be rigidly braced with #14-gauge stainless-steel angles or channels, where required, and/or angle-iron frames. All vertical corners shall be standard square break radius.
- D. In Lieu of Enclosed Cabinet Construction Outlined Above, Angle Frame Construction May be Used:
1. Angle iron frames shall be 1-1/2" x 1-1/2" x 1/8", cross-braced on 2'-6" centers full-length of items. At point of gusset attachment, provide #12-gauge stainless-steel triangular plate properly welded to bottom of frame. All joints shall be welded, ground smooth to make a perfect joint, and then sprayed with three (3) coats of enamel. Side, front, and rear panels shall be #20-gauge stainless steel.
- E. Doors:
- F. Doors shall be double pan construction, #18-gauge face, #20-gauge rear stainless steel, unless otherwise specified. Doors to be five-eighth (5/8") inch thick and filled with sound-deadening material. Provide each door with a door handle.

- G. Counter Legs:
1. Component Hardware A52-9907, six (6") inch high, adjustable, stainless-steel legs.
- H. Wheels and Casters:
1. Portable equipment shall be mounted on casters of the size specified or as provided as standard by the manufacturer, but must comply with the Load-Rating Standards of the Casters & Floor Truck Manufacturers' Association, and with the NSF Sanitary Requirements. Casters, forks, and guards are to be cadmium-plated. Wheels are to be disc steel-type with neoprene tires. Provide wheel locks, where specified.
 2. Casters shall be equal in quality to:
 - a. Jarvis & Jarvis Swivel Plate, Model 5-25-111, with or without brakes.
Jarvis & Jarvis Rigid Plate, Model 5-26-111.
Jarvis & Jarvis Stem Caster, Model 5-27-111, with or without brakes.
Jarvis & Jarvis Sealed Caster - NSF Listed.
Jarvis & Jarvis Wheel and Rotation Brakes, Model 5-50-113 GBL, five (5") inch diameter, ball-bearing, swivel.
 - b. Bassick Swivel Plate, Model 5NS6GW-2BCHR.
 - c. Bassick Swivel Pipe Leg, Model 5NS6GW-2BX67CHR.
 - d. Bassick Rigid plate, Model 5NT6GW-2BCHR.
- I. Undershelves – Open Construction:
1. Solid, removable undershelves shall be fabricated of #16-gauge stainless steel, with all edges formed to fit cross-rails with rolled drop edges one-and-one-half (1-1/2") inches deep. All corners and intersections ground and polished smooth. Cut out corners of shelves to fit snug around all leg locations. At shelf joint where cross rails do not occur, provide a one-and-one-half (1-1/2") inch, ninety (90°) degree turn-down. Turn rear edges of undershelves up one-and-one-half (1-1/2") inches with coved radius. Maximum length of sections shall be 2'-6".
 2. Solid, fixed undershelves shall be fabricated of #16-gauge stainless steel, with all free edges turned down one-and-one-half (1-1/2") inches.
 3. Notch and weld at legs. Where edges are specified to be turned up, turn up on a three-quarter (3/4") inch radius to the height specified.
 4. Weld a #14-gauge stainless-steel channel centered full-length of underside of fixed undershelves.
- J. Undershelves – Cabinet Style:
1. All cabinet shelving shall have pan-type, removable, bottom and intermediate shelves and shall be #18-gauge stainless steel, unless otherwise specifically stated, with all shelf joints welded. Turn shelves up three (3") inches at rear and ends with one (1") inch radius cove corner where shelves turn up at the rear. The turned up edges must be tight-fitting against cabinet framing and enclosure. If cabinet enclosure has sliding doors, the lower shelf shall have stainless-steel guide pins. The intermediate shelving shall be fixed, unless specifically stated otherwise.
- K. Overshelves:
1. Overshelves shall be fabricated of #16-gauge stainless steel with edges rolled down or up, as specified, having same construction as "Tops."
 2. Mount shelving on #16-gauge stainless-steel tubing of the diameter specified.
 3. Overshelves at walls are to be cantilever-mounted, with the upright passing down through the backsplash rim and bolted to extended channels for support.
 4. When overshelves are to be mounted to a flat top, secure with concealed fasteners.
- L. Wall Shelves:
1. Wall Shelves shall be fabricated of #16-gauge stainless steel, No. 4 finish, with edges rolled up or down, as specified, having same construction as "Tops." Provide with two (2")

- inch turned up rear and end risers.
2. Mount to wall on #14-gauge stainless-steel cantilever brackets. Secure brackets to wall with stainless-steel screws with lead-expansion shields. Brackets shall be spaced a maximum of 4'-0" on center.
- M. Legs:
1. All legs shall be 1-5/8" outer-diameter x #16-gauge stainless-steel tubing. Legs shall be located as shown on the plan and/or sections and shall not exceed 6'-0" on center. All joints between legs and undershelves or cross rails shall be welded, ground smooth and polished. Each leg shall be fitted with Component Hardware Model A10-0852, round bottom collar and foot insert, Type #18-8 stainless steel, sized for one-and-five-eighth (1-5/8") inch, #16-gauge tubing.
- N. Leg Sockets (Gussets):
1. Leg Sockets shall be cylindrical, one (1) piece, stainless-steel construction. Leg Sockets shall be welded to supporting members and spot welded with sealant around remaining perimeter. At legs or uprights, Leg Sockets shall fit snug and legs or uprights shall be secured by an Allen setscrew. Leg Sockets shall be Component Hardware A20-0206, Type #18-8 stainless steel.
- O. Cross Rails:
1. Cross Rails shall be 1-1/4" outer-diameter x #16-gauge stainless-steel tubing mounted ten (10") inches above the floor, ground and polished. Cross Rails shall be attached to every leg and shall be run front-to-back and full-length between legs at rear and front. When fixed undershelves are specified, cross rails may be omitted.

PART 3 EXECUTION

3.01 OPENINGS – ACCESS

- A. General: Coordinate with other contractors for provision and scheduling of temporary openings in walls or floors that may be required for passing large sections of equipment into the building that cannot be accommodated through permanent openings.

3.02 INSTALLATION

- A. General: Make arrangements for receiving food service equipment and make delivery into the building as requisitioned by installation superintendent. Do not consign any equipment to the Owner or to any other contractor without receiving written acceptance from them and making arrangements for the payment of freight and handling charges.
- B. Deliver all equipment into the building, uncrate, assemble, level, and repair any damaged or abraded surfaces. Set equipment temporarily in its final location to permit mechanical trades to take necessary measurements for the connection of the service lines. Move the equipment sufficiently to permit the installation of such service lines and then realign equipment level and plumb. Install all equipment so as to eliminate objectionable vibration.
- C. All cabinets and other items of equipment that butt against walls shall be sealed thereto with Dow Corning #732 RTV, or equal, General Electric clear silicone sealant, all excess sealant being cleaned out of the joints to a radius fillet.
- D. Where necessary, in order to seal a cabinet to the wall, provide scribing or filler strips matching the metal used in the cabinet construction and seal the strips to the wall construction with silicone sealant.

3.03 TESTING, DEMONSTRATING, AND INSTRUCTION OWNER'S DESIGNATED PERSONNEL

- A. After complete installation, all items of equipment provided under this Contract shall be operated and thoroughly tested by a factory-authorized service agency to insure proper and safe operation.

- B. Food Service Equipment Contractor shall arrange to have all mechanically-operated equipment provided under this Contract demonstrated by authorized Representatives of the equipment manufacturers. These Representatives shall instruct the Owner's designated personnel in the use, care, and maintenance of all items of equipment after equipment has been thoroughly tested by a factory-authorized service agency and is in working order. "Live" demonstrations are required. Food Service Equipment Contractor shall be present during all demonstrations.

3.04 OPERATING AND MAINTENANCE MANUALS

- A. After completion of the installation, the Food Service Equipment Contractor shall present to the Owner two (2) sets of all Operating and Maintenance Manuals and one (1) Flash Drive covering all mechanically-operated equipment provided under this contract; each set being neatly bound in a loose-leaf binder having a durable cover.
- B. Include in each binder the manufacturer, model number, and serial number of all equipment, and a list of names, addresses, and telephone numbers of local service agencies authorized to make necessary repairs and/or adjustments of the equipment provided under this Contract.

3.05 LUBRICATION – OIL AND GREASE

- A. Each moving part in the entire food facilities installation shall be provided with suitable bearings with provision for greasing or with grease gun connections suited to a high-pressure gun for distributing heavy oil or light grease. Points of lubrication shall be readily accessible. All grease guns connections shall be of the same type to fit the same gun.
- B. All bearings and packing glands shall be properly protected during installation. Before the equipment is placed in operation, they shall be filled with the type of lubricant recommended by the manufacturer of the apparatus. Prior to final acceptance, all equipment glands shall be repacked and all valve packing glands tightened.

3.06 CORRELATION WITH DRAWINGS

- A. This written specification must be closely correlated with the Drawings and Schedules. Each complements the other and cross-reference will be necessary to fulfill the requirements of the specifications. All information shown on drawings and listed in schedules shall be incorporated as part of the written specifications.

3.07 SPECIAL PROVISIONS

- A. All equipment shall be Energy Star compliant, where such listings are available for equipment categories.
- B. Provide "Torx" or equivalent, tamper-proof screws for all equipment and specific security package as indicated within item specifications.

PART 4 – SCHEDULE OF EQUIPMENT

4.01 ITEM NO. 1 – WALK-IN REFRIGERATOR	ONE
(INCLUDING 1A & 1B REFRIGERATION EQUIPMENT)	COMBINATION
ITEM NO. 2 – WALK-IN FREEZER	UNIT
(INCLUDING 2A & 2B REFRIGERATION EQUIPMENT)	REQUIRED

- A. Walk-In Refrigerator and Freezer Rooms, all as manufactured by Tafco, a TMP Company, Hyde, PA. Overall size of combination unit shall measure approximately 46'-1" long x 12'-6-1/2" wide, with an overall height of 8'-6". Building walls shall form exterior limitations around entire perimeter of combination unit, excluding two (2) door sections, each measuring approximately 4'-10" wide, which shall be exposed. Size and shape as required and as shown on Contract Drawings.
- B. Construction: Prefabricated sectional construction with metal/fiberglass interior and exterior pans "sandwiching" foamed-in-place insulation. Walk-In Freezer Room shall be provided with pressure relief vent. Provide reinforced, self-supporting ceiling panels.

- C. Approvals: Entire construction and installation of Walk-In Rooms shall comply with NSF Standards and the local building codes. Insulation shall be U.L. Rated, flame-retardant, self-extinguishing type. All electrical accessories shall be U.L. Approved.
- D. Interior and Exterior Surfaces: All unexposed exterior surfaces shall be #26-gauge galvalume. Exposed exterior front of combination unit shall be #18-gauge stucco stainless steel. All interior walls shall be minimum three-thirty-second (3/32") inch thick, U.L. Rated white fiberglass (must be applied at factory. Field lamination is not acceptable. Interior ceilings shall be .040" smooth white aluminum. All door finishes shall be #18-gauge, Type 304 stucco stainless steel, inside and out. Provide and install #16-gauge stainless-steel trim strips at points where walk-in walls adjoin building partition walls. Provide and install #16-gauge stainless-steel closure panels from top of walk-ins, along all exposed sections to finished ceiling above. Closure panels shall be secured with "Torx" tamperproof screws.
- E. Doors: Door jambs shall be U.L. Approved, fully insulated, flush-type, infitting, 2'-10" wide x 6'-6" high. Replaceable NSF gaskets. Heavy-duty chrome-plated hardware, three (3) hinges per door, and heavy-duty positive lock assembly, Kason Model 0944, in lieu of standard lock assembly. Provide Kason No. 28, door handle, and Kason No. 1345, radius-style spring-action hinges. Electrically heated contacts built into jamb, extend to junction box over door panel. Refrigerator Door shall hinge left and Freezer Door shall hinge left, and include heavy-duty Hydraulic Closer, Dictator Model V 1600. Each door shall be provided with heated, 14" x 14", three-glass insulated window. Doors shall be provided with one-eighth (1/8") inch stainless-steel abuse plates on interior and exterior from bottom of door to underside of door handle, secured with stainless-steel sheet metal screws, complete with "Torx" tamperproof heads. Walk-In Refrigerator and Freezer door openings shall be provided with CCI Industries Clear Vu PVC Swinging doors, fully encompassing entire opening. Doors shall be center opening type, with less than one (1) pound of pressure, 0.125" thick clear PVC, complete with stainless-steel hardware and stainless-steel sheet metal screws, complete with "Torx" tamperproof heads. Food Service Equipment Contractor shall remove Walk-In Doors from hinges during installation, then install doors just prior to operation of the Walk-In Rooms or shall be held responsible for damage to metal finish of Walk-In Rooms.
- F. Lighting: Walk-In Refrigerator & Freezer Rooms shall be equipped with U.L. Approved, vapor-proof, low-profile LED light fixtures with exterior switch and pilot light fully prewired to junction boxes over door panel. Provide Refrigerator with six (6) additional and Freezer with eight (8) additional, ceiling-mounted light fixtures, Kason Model 1808, complete with heavy-duty stainless-steel wire cages, prewired to junction box on the exterior of the rooms with perforations through the ceiling panels and insulated, as required, to prevent condensation formation on the interior electrical components. Provide low profile, high-impact Lexan globes and 14-watt bulbs, providing 1,100 total lumens in 4,000 K color temperature for each light fixture. Refer to Contract Drawings for locations of ceiling-mounted fixtures. Provide automatic timer device to turn all interior lights to the "Off" position within fifteen (15) minutes of units no longer being occupied by personnel.
- G. Thermometers/Alarm Systems: Walk-In Refrigerator and Freezer Rooms shall be equipped with Recess Mounted Audio/Visual-Type Temperature/Alarm System, Weiss Instruments Model XWA11V, prewired to junction box over door panel. Provide dry contacts for interconnection with building management system and/or automatic dialer (by others) — fully coordinate with Owner to obtain specific requirements. Note Food Service Equipment Contractor shall verify type of contactor, as required, to insure compatibility.
- H. Floors: Floors shall be prefabricated construction similar to that in wall and ceiling panels for installation within recessed floor area. Structural concrete, setting bed, finished wearing surface, and coved base by General Contractor. Food Service Equipment Contractor shall provide heavy-duty #16-gauge stainless-steel threshold at each door, in lieu of polymer threshold, angled as required to be transit level with kitchen floor.

- I. Hanger Rod Brackets: Provide and install hanger rod brackets, as required, to provide support for evaporator coils.
- J. Insulation: Insulation shall be urethane foamed-in-place under pressure. 97% Closed cell construction. Minimum four (4") inch thick panels. Walk-In Panels, including door sections for Refrigerator shall be provided with an insulation value of at least R-25 and Freezer Section, including door, shall be provided with an insulation value of at least R-32. All floor panels shall be provided with an insulation value of at least R-28.
- K. Refrigeration Equipment: Walk-in Refrigerator Room shall be set to maintain a temperature of 36°Fahrenheit. Walk-In Freezer Room shall be set to maintain a temperature of -10°Fahrenheit. The following Refrigeration Equipment shall be supplied and completely interconnected, ready for final electrical connections only, all as part of this specification.
- L. Provide one (1) Russell Model RFO200E4S-EANT/(2)RLA073ADARE System for Refrigerator Section. System shall include one (1), 2-horsepower condensing unit rated at approximately 16,840 BTU's-per-hour capacity and two (2) blower coils, each rated at approximately 8,500 BTU's-per-hour capacity. Provide one (1) Russell Model RFO600L4S-EBNT/(2)RL6E090DDARE system for Freezer Section, inclusive of one (1), 6-horsepower condensing unit rated at approximately 19,440 BTU's-per-hour capacity and two (2) blower coils, each rated at approximately 10,600 BTU's-per-hour capacity. All blower coils shall be provided with high-efficiency, dual EC motors. Each system shall include integral EcoNet Control Package, including Sporlan EEV, suction pressure transducer; suction, entering air, Coil Temp Thermistors; local on-board two (2) row LCD Display, Push-Button adjustments, and Tamper Proof Package. Freezer System shall also include Model HX-75, Heat Exchanger, fully installed.
- M. Each Refrigeration System shall consist of a galvalume metal weathershield on a galvanized structural steel base, compressor, liquid receiver, air-cooled condenser, fused disconnect, complete refrigeration and electrical accessories, and two (2) evaporators. Both Refrigerator and Freezer Condensing Unit Sections shall be charged with Refrigerant R448A. The liquid-line sight glass/moisture indicator, filter-drier (isolated by two (2) service valves), suction line kit, suction line filter, and suction accumulator (as required) shall be factory-installed and leak-tested with the condensing units.
- N. Systems shall be designed to operate properly at low ambient conditions. This shall be accomplished with the use of condenser fan cycling, crankcase heater, suction accumulator, and the use of rapid-response, balanced, port expansion valves. Condensing units shall be installed on building roof above Level 3 of building, at location indicated on Architectural Contract Drawings. Required condensing unit mounting curbs and pipe portals shall be provided by the Food Service Equipment Contractor and installed by the General Contractor. Mounting curbs shall be ThyCURB 12" high x 9-1/2" wide, including mounting flange, and shall be constructed of #18-gauge galvanized steel shell, 2" x 6" wood nailer, internal bulkheads, and one (1) curb longer than the other to include integral three-and-one-half (3-1/2") inch diameter sleeves for EPDM boots and clamps to accommodate extending of utility lines. Food Service Equipment Contractor shall closely coordinate this work with General Contractor and all other responsible Contractors. Systems shall be completely factory-piped and wired requiring only connection pipe and wiring between evaporators and condensing units.
- O. The compressor for the Walk-In Freezer shall be Next Gen Minicon Scroll Type with 3,500-rpm motor and wired for 208 volt, 60-cycle, three-phase operation. Compressor shall include internal overload protection, positive lubrication system, suction and discharge-line vibration isolators, rubber mounts, and crankcase heater.
- P. The compressor for the Walk-In Refrigerator shall be Next Gen Minicon Scroll Type with 3,500-rpm motor and wired for 208/230 volt, 60-cycle, three-phase. Compressor shall include internal overload protection, positive lubrication system, suction and discharge-line vibration isolators,

rubber mounts, and crankcase heater.

- Q. Air-cooled condensers shall be constructed of aluminum die-formed fins mechanically bonded to copper tubes with an integral sub-cooling coil. Condensing fan motors shall be life-lubricated with internal thermal overload protection.
- R. Controls to be located in weather-protected, factory-installed-and-wired control panel. Wiring to be in accordance with NEC. Controls shall consist of compressor motor contactor, high/low pressure switch, and oil pressure switch (as required).
- S. Evaporators shall be of sufficient capacity to balance with their respective condensing unit to provide the proper storage conditions.
- T. The Freezer evaporator motors shall be wired for 208 volt, 60-cycle, single-phase. Motors shall be life-lubricated with thermal overload protection. Each assembly shall include properly-sized, balanced port expansion valves, heat exchanger, and integral EcoNet Control Package.
- U. The Refrigerator evaporator motors shall be wired for 115 volt, 60-cycle, single-phase. Motors shall be life-lubricated with thermal overload protection. Each assembly shall include properly-sized, balanced port expansion valves, heat exchanger, and integral EcoNet Control Package.
- V. All drain lines from evaporators shall extend to safe waste drain and direct downward into drain on the exterior of refrigerator and be fabricated of copper tubing. Freezer drain lines shall be wrapped with heater tape (15-watts per foot of drain line) and provided with grounded cord and plug assembly to accommodate plugging into receptacle mounted within walk-in freezer — fully coordinate with Electrical Contractor. Drain line shall be provided with necessary "P-trap" as recommended by the manufacturer to eliminate warm air from entering system. Food Service Equipment Contractor shall provide corrosion-resistant hanger rods, through-the-wall insulated sleeves, etc, as required, for proper installation of the evaporators.
- W. If the length of refrigerant piping shall be such that the total refrigerant charge would exceed the receiver capacity, the liquid-line solenoid valve shall be moved to the evaporator locations or an oversized receiver shall be provided as needed.

4.02 ITEM NO. 3 – SHELVING

THIRTY-ONE REQUIRED

- A. New Age heavy duty aluminum all-welded bar style shelving unit, with weight capacity of 1,500 pounds per shelf, with minimum 1-1/2" x 1-1/2" x .070" posts and shelves with adjustable feet (unless noted). Provide the following complete units:
 - 1. Sixteen (16) Model 1070, 42" long x 20" wide x 72" high, four-shelf units.
 - 2. Fourteen (14) Model 1062, 48" long x 20" wide x 72" high, four-shelf units.
 - 3. One (1) Model 1066-CL, 48" long x 24" wide x 72" high, four-shelf mobile unit, with four (4) five-inch diameter swivel casters.
- B. Note the mobile unit shall be for use within the kitchen area at location indicated on Contract Drawings.

4.03 ITEM NO. 4 – SHELVING

ELEVEN REQUIRED

Not in Food Service Contract — Future Purchase

- A. New Age all-welded bar-style shelving unit, with weight capacity of 1,500 pounds per shelf, with minimum 1-1/2" x 1-1/2" x .070" posts and shelves with adjustable feet. Provide the following complete units:
- B. One (1) Model 1061, 36" long x 20" wide x 72" high, four-shelf unit.
 - 1. Three (3) Model 1070, 42" long x 20" wide x 72" high, four-shelf units.
 - 2. Seven (7) Model 1062, 48" long x 20" wide x 72" high, four-shelf units.

4.04 ITEM NO. 5 – DUNNAGE RACK

SIXTEEN REQUIRED

- A. New Age heavy-duty, all-welded aluminum unit with maximum distributed load capacity of 2,500 pounds, constructed of 1-1/2" x 1-3/4" x .070" aluminum tubing, with capped and welded

feet.

B. Provide the following units:

1. One (1) Model 2004, 36" long x 20" wide x 12" high unit, with five (5) laterals.
2. Fifteen (15) Model 2005, 48" long x 20" wide x 12" high units, with five (5) laterals.

4.05 ITEM NO. 6 – DUNNAGE RACK

EIGHT REQUIRED

Not in Food Service Contract Future Purchase

- A. New Age heavy-duty, all-welded aluminum unit with maximum distributed load capacity of 2,500 pounds, constructed of 1-1/2" x 1-3/4" x .070" aluminum tubing, with capped and welded feet.

B. Provide the following units:

1. Eight (8) Model 2005, 48" long x 20" wide x 12" high units, with five (5) laterals.

4.06 ITEM NO. 7 – CAN RACK

ONE REQUIRED

- A. Piper Products Model CSR-FF-156-Y5-R-WB. Heavy-duty, all welded aluminum construction; one-hundred-fifty-six (156) No. 10 can capacity, with front-load/front-unload system. Provide four (4), five (5") inch diameter polyurethane casters, front two (2) with locking brakes; and rotating bumpers.

4.07 ITEM NO. 8 – NOT USED

4.08 ITEM NO. 9 – STORAGE CABINET

ONE REQUIRED

- A. Piper Products Model 7773-M-Modified. Mobile unit shall be all stainless-steel construction, with four (4) shelves, each with double reinforcing angles; four (4), five (5") inch diameter, heavy-duty swivel casters, two (2) front with locking brakes; and double pan locking hinged doors.

4.09 ITEM NO. 10 – NOT USED

4.10 ITEM NO. 11 – NOT USED

4.11 ITEM NO. 12 – HAND SINK

THREE REQUIRED

- A. Advance Model 7-PS-64-Modified. Provide heavy-duty, fixed, self-closing, deck-mounted metering faucet with mixing valve; fully-welded stainless steel left-hand side splash on two (2) units (units adjacent to Work Table with Sink, Item No. 13, and Beverage Counter, Item No. 52), and fully-welded stainless steel right-hand side splash (unit adjacent to Preparation Table with Sinks, Item No. 19), and tubular stainless-steel support brackets. Securely attach and seal to wall at locations indicated on Contract Drawings.

4.12 ITEM NO. 13 – WORK TABLE WITH SINK

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Seal entire assembly to building wall and provide flanged feet, securely attaching to building floor to prohibit movement of table.
- B. Food Service Equipment Contractor shall extend drain line to floor sink and direct downward into floor sink.

4.13 ITEM NO. 14 – MIXER

ONE REQUIRED

- A. Hobart Model HL-400. 208 Volt, three-phase operation. Provide the following Hobart accessory items:
1. 40-Quart Stainless-Steel Mixing Bowl.
 2. 40-Quart "B" Beater.
 3. 40-Quart "C" Wing Whip.
 4. 40-Quart "D" Wire Whip.
 5. 40-Quart Standard Bowl Truck.
 6. Deck Mounting Kit.

- B. Food Service Equipment Contractor shall securely attach deck mounting assembly to building floor at location indicated on Contract Drawings.

4.14 ITEM NO. 15 – WORK TABLE

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Seal entire assembly to building wall and provide flanged feet, securely attaching to building floor to prohibit movement of table. Note, Ingredient Bins, Items No. 16, shall roll under table at locations indicated on Contract Drawings.

4.15 ITEM NO. 16 – INGREDIENT BIN

THREE REQUIRED

- A. Piper Products Model 47-150. 150-Pound capacity, complete with slide-off stainless-steel cover, coved corners, and one-piece rubber bumper assembly. Note units shall be sized to roll under Work Table, Item No. 15, at locations indicated on Contract Drawings.

4.16 ITEM NO. 17 – WORK TABLE

TWO REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Note Can Opener, Item No. 27, shall be securely attached to one (1) unit at location indicated on Contract Drawings.

4.17 ITEM NO. 18 – POWER POLE

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All #10-gauge stainless-steel construction. Unit shall measure forty-eight (48") inches high and be constructed of #10-gauge stainless steel, complete with brushed finish and all necessary stainless steel internal framing to maximize structural rigidity. Unit shall be provided with base flange around full perimeter to accommodate securing to building floor. Provide flat top, three (3) 120 volt, single-phase, ground fault interrupted duplex receptacles, and one (1), 208 volt, three-phase receptacle, all with stainless-steel faceplates. Each receptacle shall be independently circuited and interconnected to independent electrical feeds (by Electrical Contractor) provided through building floor.
- B. Food Service Equipment Contractor shall verify items to be plugged into these receptacles and coordinate plug configurations.
- C. Securely attach to building floor with stainless steel fasteners and seal entire perimeter to floor.

4.18 ITEM NO. 19 – PREPARATION TABLE WITH SINKS

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Seal entire assembly to building wall and provide flanged feet, securely attaching to building floor to prohibit movement of table.
- B. Food Service Equipment Contractor shall extend drain lines to floor sink and direct downward into floor sink.

4.19 ITEM NO. 20 – EQUIPMENT STAND

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Provide four (4) plate casters, complete with wheel and rotation brakes.

4.20 ITEM NO. 21 – FOOD CUTTER

ONE REQUIRED

- A. Hobart Model 84186. 208 Volt, three-phase operation, complete with grounded cord and plug. Provide No. 12 attachment hub and standard Hobart accessories.

4.21 ITEM NO. 22 – POWER POLE

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All #10-gauge stainless-steel construction. Unit shall measure forty-eight (48") inches high and be constructed of #10-gauge stainless steel, complete with brushed finish and all necessary stainless steel internal framing to maximize structural rigidity. Unit shall be provided with base flange around full perimeter to accommodate securing to building floor. Provide flat top, three (3) 120 volt, single-phase,

ground fault interrupted duplex receptacles, and one (1), 208 volt, three-phase receptacle, all with stainless-steel faceplates. Each receptacle shall be independently circuited and interconnected to independent electrical feeds (by Electrical Contractor) provided through building floor.

B. Food Service Equipment Contractor shall verify items to be plugged into these receptacles and coordinate plug configurations.

C. Securely attach to building floor with stainless steel fasteners and seal entire perimeter to floor.

4.22 ITEM NO. 23 – EQUIPMENT STAND

ONE REQUIRED

A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Provide four (4) plate casters, complete with wheel and rotation brakes.

4.23 ITEM NO. 24 – SLICER

ONE REQUIRED

A. Hobart Model HS9. 120 Volt, single-phase, complete with grounded cord and plug. Provide standard equipment and the following Hobart accessory items:

1. Food Chute.
2. Low Fence.

B. Unit shall plug into compatible receptacle mounted within Power Pole, Item No. 22 — coordinate accordingly.

4.24 ITEM NO. 25 – WORK TABLE

TWO REQUIRED

A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction.

4.25 ITEM NO. 26 – WORK TABLE

TWO REQUIRED

A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Note Can Opener, Item No. 27, shall be securely attached to one (1) unit at location indicated on Contract Drawings.

4.26 ITEM NO. 27 – CAN OPENER

TWO REQUIRED

A. Edlund Model G-2SL. Provide stainless-steel base, long bar. Units shall be securely attached to Work Tables, Items No. 17 and No. 26, and at locations indicated on Contract Drawings. Provide chrome-plated acorn cap nuts on fasteners beneath each Work Table.

4.27 ITEM NO. 28 – NOT USED

4.28 ITEM NO. 29 – UTILITY DISTRIBUTION SYSTEM

ONE REQUIRED

A. Halton Model KDS. Utility Distribution System shall be provided as a complete system, U.L. Listed and manufactured in accordance with the latest edition of the National Electric Code, NEMA, NFPA, Pamphlet No. 96 and No. 54, Uniform Plumbing Code and OSHA utilizing only U.L. Listed, AGA, and CGA certified components. Note unit shall be reinforced and include utilities/structure to accommodate installation of Water Filtration Systems, at locations indicated.

B. Overall size of assembly shall measure approximately 18'-0" long x 14" wide, with 24" x 12" cross-sections at each (end closest to Walk-In Refrigerator - for electric and natural gas) and opposite end (for natural gas and water). System shall be completely pre-wired and pre-plumbed for two (2) final connections point for electric; one (1) final connection point for hot water; one (1) final connection point for cold water; and two (2) final connections points for natural gas (looped system), to accommodate all equipment shown on Contract Drawings. Assembly shall also include light and fan switches for Ventilators.

C. The island configuration of the KDS's horizontal raceway shall be finished with a peaked plenum to incorporate Halton's patented Capture Jet technology to reduce the exhaust airflow rate required and to improve capture and containment efficiency of the respective Ventilators.

The Capture Jet air shall be introduced through a special discharge panel and be of sufficient velocity to assist the thermal plume toward the KSA grease extractors. The Capture Jet fan shall be internally mounted in the vertical riser prewired with speed control. Provide matching stainless steel filler panels between cross-section towers.

- D. System shall be floor-mounted with electric and plumbing in two (2) separate modules forming a watertight barrier. Module shall be constructed of #16-gauge and #20-gauge, Type 304 stainless steel with a No. 4 mill finish. Removable link plates shall be constructed of #16-gauge stainless steel.
- E. Electrical components shall be completely enclosed housing accessible by via stainless-steel panels secured by Torx screws. Internal electric main feeders shall be cable bus-type having balanced load in phases with branch circuit locations directly behind connection plates. Cable bus shall be manufactured from 100% copper and mounted on nonconductive insulators spaced as indicated and equipped with connection lugs for main service. Field joints shall be connected by attaching cable to insulated terminal. Branch circuit wiring for each electrical connection shall be phase identified in size and accordance with circuit breaker rated ampacity. Provide twelve (12") inch long, interchangeable, #16-gauge stainless-steel link connection plate for each electrical connection equipped with point of use circuit breaker and grounding-type receptacle or prewired flexible Seal-Tite conduit. Connection plates shall also be equipped with permanently lettered electrical characteristics and spaced on twelve (12") inch centers, readily interchangeable by maintenance personnel. Provide blank plates for future equipment. Provide one (1), 125-Amp, 120/208 volt, three-phase main electrical circuit breaker mounted within control tower.
- F. Plumbing compartment shall be isolated from electrical compartment. All piping and disconnection systems shall be color-coded and field joints shall be secured by tightening unions. All hot and cold water piping, including individual branch pipe connection, shall be hard temper type (L) copper tubing with copper, sweat-type solder fitting. All water lines shall be covered with three-eighth (3/8") inch thermal closed cell, pipe insulation per ASTM-E90-C. Each branch connection shall be provided with brass, double-shutoff quick-disconnect, flexible hose connection consisting of brass bellows-type corrugated hose with braided stainless-steel restraining sleeve. Gas piping shall be minimum one-and-one-half (1-1/2") inch diameter, black iron pipe with welded thread-o-lets to branch connections and drip-tee, in service riser. Each branch connection shall be provided with one-quarter (1/4) turn, ball-type, shutoff valve, brass quick disconnect, and two (2) wall stainless-steel flexible hose connectors with braided stainless-steel restraining sleeve. Provide one-quarter (1/4) turn, ball-type shutoff valve for all water main incoming services. Provide one-quarter (1/4) turn, ball-type shutoff valve for gas branch piping to be connected to individual equipment. Note the cold water supply line shall be one-half (1/2") inch, hot water supply line shall be one-half (1/2") inch, and the looped natural gas supply line shall be one-and-one-half (1-1/2") inch diameter.
- G. Provide fire-fuel shutoff for electric services for equipment per NFPA, Current Edition. Entire Shutoff System shall be enclosed within unit, completely prewired and requiring only final connection by Electrical Contractor from 120-volt power source in fire extinguishing system relay or micro switch. Provide manual reset for gas and electrical connections. Gas solenoid valve shall be built-into tower and shall be equipped with battery back-up system to eliminate instantaneous power interruptions from causing nuisance pilot outages.
- H. Provide safety guard for system disconnect switch to eliminate accidental activation.

4.29 ITEM NO. 30 – GRIDDLE WITH STAND

ONE REQUIRED

- A. Southbend Model HDG-24. Natural gas operation. Provide Electronic Spark Ignition System, complete with full complement of batteries; stainless-steel front, vent, and sides; reinforced insulated double wall sides; one (1") inch thick, polished, rolled steel plate; flame-failure safety device; three-quarter (3/4") inch rear gas connection; thermostatic controls; front grease trough; integral grease drawer; full-length x 6" wide, and stainless-steel plate shelf.

- B. Provide matching Southbend stainless-steel mobile equipment stand, complete with stainless-steel undershelf, and four (4), five (5") inch diameter, heavy-duty casters, two (2) front swivel with locking brakes.
- C. Manufacturer shall provide gas-pressure regulator, as required.
- D. Provide and install Gas Quick Disconnect Assembly Kit, Dormont Model 1675KIT2S36, complete with required adapters. Restraining device shall be securely attached to frame members of Utility Distribution System and frame members of stand.
- E. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.
- F. Food Service Equipment Contractor shall provide and install Dormont Safety-Set Positioning Hardware to accommodate rear casters of stand to comply with NFPA Code Standards, securely attaching and sealing to building floor.

4.30 ITEM NO. 31 – BRAISING PAN

ONE REQUIRED

- A. Cleveland Model SGL-40-T1. Natural gas. 120-Volt, single-phase operation, complete with grounded cord and plug for Electronic Spark Ignition System and controls. Forty (40) gallon capacity, with nine-and-one-half (9-1/2") inch deep pan. Provide manual-tilt mechanism; spring-assist cover with adjustable vent; adjustable leveling feet with rear flanged feet; high limit safety device; anti-splash pouring lip; and two (2") inch tangent draw-off valve. Provide gallon etch markings from five (5) gallons to forty (40) gallons in five (5) gallon increments.
- B. Manufacturer shall provide gas-pressure regulator, as required.
- C. Provide and install Gas Quick Disconnect Assembly Kit, Dormont Model 16100KIT2S36, complete with required adapters.
- D. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.
- E. Food Service Equipment Contractor shall fully align pour path and tangent draw-off valve with Floor Trough with Grating, Item No. 32, and secure flanged feet to building floor.

4.31 ITEM NO. 32 – FLOOR TROUGH WITH GRATING

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Grating shall be IKG Industries, close-mesh stainless-steel grating Type CM-2 (Type 304 Stainless Steel), or approved equal. Bearing bars spaces one-half (1/2") inch centers, interspacing to be five-sixteenth (5/16") inch. Crossbars spaced on four (4") inch centers. Grating to be size indicated on detail drawing.
- B. Food Service Equipment Contractor shall deliver drain pan to General Contractor for his installation. Food Service Equipment Contractor shall coordinate and cooperate with General Contractor with regard to installation of drain pan. When installed, grating insert shall be flush and level with surrounding kitchen floor. Top and bottom surfaces of grating shall be ground smooth and polished to remove burrs, imperfections, etc.
- C. Food Service Equipment Contractor shall coordinate floor drain to be used by Plumbing Contractor with the fabricated stainless-steel drain pan.

4.32 ITEM NO. 33 – FILL STANCHION

ONE REQUIRED

- A. T & S Model B-0188-Modified. Unit shall be provided with required check valves, continuous pressure vacuum breaker, 6'-0" long stainless-steel hose assembly, double pantry control valve assembly, hook and bolt assembly, and pot filler assembly, Model B-102-A. Base assembly shall be securely attached to building floor with stainless steel fasteners at locations indicated on Contract Drawings and sealed to floor. Base assembly shall be modified as required to enable entry of water lines, directly beneath, field coordinate accordingly.

4.33 ITEM NO. 34 – KETTLE**ONE REQUIRED**

- A. Cleveland Model KGL-40-TSH. Natural gas, tilting design with low rim (maximum of thirty-six-and-five-eighth (36-5/8") inches high). 120 Volt, single-phase operation, complete with grounded cord and plug for controls and Electronic Spark Ignition System. Forty (40) gallon capacity. Provide spring-assisted, stainless-steel cover; two (2") inch tangent draw-off valve; perforated disk; solid disk; Tilting Kettle Accessory Kit; and kettle etch marks from five (5) gallons to forty (40) gallons in five (5) gallon increments.
- B. Manufacturer shall provide gas-pressure regulator, as required.
- C. Food Service Equipment Contractor shall provide and install Gas Quick Disconnect Kit, Dormont Model 1675KIT2S36, complete with required adapters.
- D. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.
- E. Food Service Equipment Contractor shall align pour path of Kettle with Floor Trough with Grating, Item No. 35, and secure flanged feet to building floor.

4.34 ITEM NO. 35 – FLOOR TROUGH WITH GRATING**ONE REQUIRED**

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Grating shall be IKG Industries, close-mesh stainless-steel grating Type CM-2 (Type 304 Stainless Steel), or approved equal. Bearing bars spaces one-half (1/2") inch centers, interspacing to be five-sixteenth (5/16") inch. Crossbars spaced on four (4") inch centers. Grating to be size indicated on detail drawing.
- B. Food Service Equipment Contractor shall deliver drain pan to General Contractor for his installation. Food Service Equipment Contractor shall coordinate and cooperate with General Contractor with regard to installation of drain pan. When installed, grating insert shall be flush and level with surrounding kitchen floor. Top and bottom surfaces of grating shall be ground smooth and polished to remove burrs, imperfections, etc.
- C. Food Service Equipment Contractor shall coordinate floor drain to be used by Plumbing Contractor with the fabricated stainless-steel drain pan.

4.35 ITEM NO. 36 – CONVECTION STEAMER**ONE REQUIRED**

Deduct Alternate FS-1

- A. Cleveland Model 24CGA10.2ES. Natural gas. 120 Volt, single-phase operation for controls, fan motors, and pilotless ignition system. Provide twin independent, atmospheric gas-fired generators, electro-mechanical timer with load compensating feature; gas valve; water level control system; doors hinged left; and six (6") inch high, adjustable stainless-steel legs. Unit shall include cold water condenser to reduce discharge temperature of water to below 140°Fahrenheit, shall accommodate a total of ten (10), 12" x 20" x 2-1/2" deep pans and be provided with easily accessible cleaning port on top of unit, complete with generator cleaning light and generator steam stand-by mode. Provide a total of one (1) case (six (6) one-gallon containers with quart markings) of Dissolve Descaling Solution.
- B. Manufacturer shall provide gas pressure regulator, as required.
- C. Food Service Equipment Contractor shall provide and install Gas Quick Disconnect Kit, Dormont Model 1675KIT2S36, complete with required adapters.
- D. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.
- E. Food Service Equipment Contractor shall provide Water Treatment System, EverPure Claris, Model CWT-06, and install on Utility Distribution System, Item No. 29, at location indicated on Contract Drawings, interconnecting to steamer utilizing copper piping. Unit shall be provided complete with three-eighth (3/8") inch head and two (2) hoses, Model EV433952, along with

one (1) case of Pre-Filters, Model EC-110, and four (4) additional Filter Cartridges, Model CWT-XLC-1. Food Service Equipment Contractor shall acquire water sample and forward to EverPure for analysis and report, adjusting system, as required, to accommodate water conditions prior to operation of convection steamer.

- F. Food Service Equipment Contractor shall extend drain lines to floor sink and direct downward into floor sink.

4.36 ITEM NO. 37 – VENTILATOR WITH HEAT SENSOR

ONE REQUIRED

- A. Halton Model KVE/CPB. 120 Volt, single-phase operation for Capture Jet Fan and lights. Ventilator shall measure approximately 18'-0" long (two 9'-0" long equal sections) x 5'-9" wide and shall be installed 6'-8" above finished floor. Cfm, duct sizes, and static pressures as shown on Contract Drawings. Provide and install six (6) recessed LED light fixtures, complete with bulbs, all pre-wired to single junction box by Food Service Equipment Contractor. Light and exhaust fan switches shall be interwired to control within Utility Distribution System, Item No. 29, by the Food Service Equipment Contractor. Ventilator shall be provided with full-length removable KSA stainless-steel filters. Provide Capture Jet Fan technology (with top-mounted intake fan) at front and both ends, test air balance ports, and filter removal tool. Each exhaust duct shall be provided with mechanical balancing damper, which shall be fully welded at factory. Provide full-length stainless-steel ceiling plenum box, abutting front of Ventilator, in matching sections, to accommodate introduction of make-up air. Make-up air shall be tempered to required levels by HVAC System Contractor. Assembly shall be ceiling hung using hanger rods attached to structural members above finished ceiling and full perimeter. Provide and install #18-gauge stainless-steel closure panels around exposed perimeter of Ventilator to finished ceiling above, and between this Ventilator and Ventilator, Item No. 41. Ventilator shall include stainless-steel filler panels between the bottom back of this Ventilator, Ventilator, Item No. 41, and Utility Distribution System risers as shown on Contract Drawings. Seal to Utility Distribution System.
- B. Ventilator Sections shall be provided with continuous capture, eliminating center mullions.
- C. All work shall be in accordance with NSF Requirements and bear its Seal. Ventilator shall be U.L. Listed, with entire System designed, constructed, and installed in strict compliance with NFPA, Current Edition. Unit shall be listed / certified by nationally-recognized testing laboratory in the project area.
- D. Provide and install integral Heat Sensors and Heat Sensor Control Panel. Control Panel shall be mounted atop this Ventilator, wired for 120 volt, single-phase operation, and shall be interconnected to heat sensors within Ventilator by Food Service Equipment Contractor. Interconnection between control panel and exhaust fan shall be by others — fully coordinate. Entire assembly and installation shall comply with IMC, Section 507.2.1.1 Standards.

4.37 ITEM NO. 38 – FRYERS WITH FILTER & HEAT LAMP

ONE SYSTEM REQUIRED

Deduct Alternate FS-2

- A. Frymaster Model FMJ350C. Provide three (3), fifty (50) pound fat capacity fryers, complete with integral filtration system and matching spreader cabinet, including dump station and heat lamp. Fryers shall be natural gas. 120 Volt, single-phase operation, complete with grounded cord and plug for controls; Electronic Ignition Systems; and CM3.5 Digital Controllers/Timers. Provide stainless-steel pot, door, and cabinetry. Dump Cabinet shall be installed on left end of battery at location indicated on Contract Drawings. Dump Cabinet shall be provided with integral rod-type food-warming and holding station with Food Warmer, Model FWH-1A, wired for 120 volt, single-phase operation, with grounded cord and plug. Provide stainless-steel fry pot covers and flue deflectors; connecting "T" strips; filtration system beneath fryers; and full set of five (5") inch diameter, heavy-duty swivel casters, front with locking brakes.
- B. Manufacturer shall provide gas-pressure regulator, as required.

- C. Food Service Equipment Contractor shall provide and install Gas Quick Disconnect Assembly Kit, Dormont Model 16100KIT2S36, complete with required adapters. Removable restraining device shall be securely attached to frame members of Fryer Battery and Utility Distribution System, Item No. 29.
- D. Food Service Equipment Contractor shall fully interconnect all utilities to Utility Distribution System, Item No. 29.
- E. Provide and install Dormont Safety-Set Positioning Hardware to accommodate rear casters of fryer battery to comply with NFPA Code Standards, fully securing and sealing to building floor.

4.38 ITEM NO. 39 – RANGE WITH OVEN

ONE REQUIRED

- A. Southbend Platinum Series, Model P36D-XX. Natural gas operation, with one (1") inch rear gas connection. 120 Volt, single-phase operation, complete with grounded cord and plug for electronic ignition system. Cap and trim front right and left manifolds. Provide stainless-steel front, sides, rear, exterior bottom, and front rail; four (4), five (5") inch diameter, heavy-duty swivel casters, two (2) front with locking brakes; battery-operated Ignition System, complete with full complement of batteries for burners; Electronic Oven Pilot Ignition System; removable drip tray; two (2) oven racks; and twenty-four (24") inch high, stainless-steel flue riser with tubular shelf.
- B. Manufacturer shall provide gas-pressure regulator, as required.
- C. Food Service Equipment Contractor shall provide and install Gas Quick Disconnect Assembly Kit, Dormont Model 16125KIT2S36, complete with required adapters. Removable restraining device shall be securely attached to frame members of range and Utility Distribution System, Item No. 29.
- D. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.
- E. Food Service Equipment Contractor shall provide and install Dormont Safety-Set Positioning Hardware to accommodate rear casters of assembly to comply with NFPA Code Standards. Securely attach and seal to building floor.

4.39 ITEM NO. 40 – CONVECTION OVEN

ONE REQUIRED

- A. Southbend Model SLGS/22SC. Natural gas. 120 Volt, single-phase operation, complete with grounded cords and plugs for two-speed fan motors, controls, and electronic ignition systems. Stainless-steel front, both sides, and top. Provide gas manifold and four (4), four (4") inch diameter, heavy-duty swivel casters, two (2) front with locking brakes. Provide one (1) additional rack per deck.
- B. Manufacturer shall provide gas-pressure regulator, as required.
- C. Food Service Equipment Contractor shall provide and install Gas Quick Disconnect Assembly Kit, Dormont Model 1675KIT2S36. Secure removable restraining device to frame members of convection oven and Utility Distribution System, Item No. 29.
- D. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.

4.40 ITEM NO. 41 – VENTILATOR WITH HEAT SENSOR

ONE REQUIRED

- A. Halton Model KVE/CPB. 120 Volt, single-phase operation for Capture Jet Fan and lights. Ventilator shall measure approximately 12'-6" long x 5'-6" wide and shall be installed 6'-8" above finished floor. Cfm, duct sizes, and static pressures as shown on Contract Drawings. Provide and install four (4) recessed LED light fixtures, complete with bulbs, all pre-wired to single junction box by Food Service Equipment Contractor. Light and exhaust fan switches shall be interwired to control within Utility Distribution System, Item No. 29, by the Food Service Equipment Contractor. Ventilator shall be provided with full-length removable KSA stainless-

steel filters. Provide Capture Jet Fan technology (with top-mounted intake fan) at front and both ends and test air balance ports. Each exhaust duct shall be provided with mechanical balancing damper, which shall be fully welded at factory. Provide full-length stainless-steel ceiling plenum box, abutting front of Ventilator, to accommodate introduction of make-up air. Make-up air shall be tempered to required levels by HVAC System Contractor. Assembly shall be ceiling hung using hanger rods attached to structural members above finished ceiling and full perimeter. Provide and install #18-gauge stainless-steel closure panels around exposed perimeter of Ventilator to finished ceiling above, and between this Ventilator and Ventilator, Item No. 37. Ventilator shall include s/s filler panels between the bottom back of this Ventilator, Ventilator, Item No. 37, and Utility Distribution System risers as shown on Contract Drawings. Seal to Utility Distribution System.

- B. All work shall be in accordance with NSF Requirements and bear its Seal. Ventilator shall be U.L. Listed, with entire System designed, constructed, and installed in strict compliance with NFPA, Current Edition. Unit shall be listed / certified by nationally-recognized testing laboratory in the project area.
- C. Provide and install integral Heat Sensors and Heat Sensor Control Panel. Control Panel shall be mounted atop this Ventilator, wired for 120 volt, single-phase operation, and shall be interconnected to heat sensors within Ventilator by Food Service Equipment Contractor. Interconnection between control panel and exhaust fan shall be by others — fully coordinate. Entire assembly and installation shall comply with IMC, Section 507.2.1.1 Standards.

4.41 ITEM NO. 42 – FIRE SUPPRESSION SYSTEM

ONE REQUIRED

- A. Provide cooking equipment Ventilators, Items No. 37 and 41, with Fire Suppression System, Ansul Model R-102, with all piping concealed, where possible. System shall be field-tested and certified by local Ansul representative after installation. Fire Suppression System shall encompass equipment and installation necessary to comply with current edition, NFPA and local authority having jurisdiction. U.L. Listed, wet-chemical type. Automatic controls to flood plenum areas, ducts and surface areas, where required. Exposed piping and conduit shall be kept to a minimum; where exposed, piping and fittings shall be chrome-plated or fitted with tight-fitting, stainless-steel sleeves.
- B. Automatic fuel shutoff device shall be furnished, as required, with all necessary and required micro switches or contactors. Fuel shutoff device shall be mechanically operated shutoff valve. Note if all electrical appliances are wired to shunt trip breaker in electrical panel box by Electrical Contractor, then contactors will not be required.
- C. Note: Ansul System must comply with U.L. 300 Standard, Current Edition.
- D. File inspection report for one (1) year from date System is put into continuous operation with Rating Bureau having jurisdiction.

4.42 ITEM NO. 43 – BLAST CHILLER/SHOCK FREEZER

ONE REQUIRED

Deduct Alternate FS-3

- A. Victory Model VBCF-12-100U. Combination blast chiller/shock freezer shall be wired for 208 volt, three-phase operation, complete with grounded cord and plug. Self-contained, air-cooled unit shall be provided with non-C.F.C. refrigerant; soft, hard, timed, or core probe blast chilling; soft, hard, timed, or core probe shock freezing; multi-point sensor temperature display button; HACCP alarm display button; adjustable evaporator fan speed button; LCD illuminated temperature display; time clock; high-precision, heated, 4-point multi-sensor probe (detachable); UV sterilization lamp; USB data recorder/interface; left-hand door hinging; six (6") inch high, adjustable, stainless-steel legs; and ability to accommodate twelve (12), 12" x 20" x 2-1/2" deep pans or twelve (12), 18" x 26" pans. Unit shall accommodate a chilling capacity of one-hundred (100) pounds within ninety (90) minutes, and a freezing capacity of seventy pounds (70) within two-hundred-forty (240) minutes.

4.43 ITEM NO. 44 – RACK OVEN**ONE REQUIRED**

- A. Baxter Model OV500G1. Natural gas. 208 Volt, three-phase operation and 120 volt, single-phase operation for power requirements. All stainless-steel construction, complete with weldless heat exchanger; self-contained steam system; programmable digital controls for four-stage baking; Auto "On/Off" Control; Auto-Vent; cool-down mode; and ninety-nine (99) programmable menus; "idle" mode; full-length door hinged left, complete three-pane viewing window; flush stainless-steel floor; and independent electrically-interlocked air safety switches for draft inducer and hood. Unit shall be provided complete with UL710 Listed stainless steel Type 1 Hood System, complete with proving switch. Hood shall be securely attached to front of assembly. Unit shall be provided with front drain — extend to floor drain and direct downward into floor drain. Trim and seal unit to floor and wall, utilizing #18-gauge stainless steel angle, as required. Food Service Equipment Contractor shall provide and install #18-gauge stainless steel closure panels around exposed perimeter of hood and entire oven to finished ceiling above. Seal to wall. Note unit shall accommodate rolling in of Rack, Item No. 45.
- B. Manufacturer shall provide gas pressure regulator, as required.
- C. Food Service Equipment Contractor shall provide and install Gas Quick Disconnect Kit, Dormont Model 16100KIT2S36 (verify required length, as per field conditions), complete with required adapters.
- D. Food Service Equipment Contractor shall provide Water Treatment System, EverPure Claris, Model CWT-06, and install on building wall to right of unit at location indicated on Contract Drawings, and interconnect to steam system water connection. Provide complete with three-eighths (3/8") inch head and two (2) Hoses, Model EV433952, along with one (1) case of Pre-Filters, Model EC-110, and four (4) additional Filter Cartridges, Model CWT-XLC-1. Food Service Equipment Contractor shall acquire water sample and forward to EverPure for analysis and report, adjusting System, as required, to accommodate water conditions prior to operation of Rack Oven.
- E. Cap rear drain connection at factory.
- F. Provide Minimum Security Prison Package.

4.44 ITEM NO. 45 – RACK**FOUR REQUIRED**

- A. Baxter heavy-duty #16-gauge stainless-steel Rack for use with Rack Oven, Item No. 44. Provide three (3) units, Baxter Model BSRSE-20, complete with three (3") inch ledge spacing and a capacity of twenty (20) pans, and one (1) unit, Model BSRS-12, with five (5") inch ledge spacing to accommodate a total of twelve (12) pans. Units shall be fully assembled, welded at factory and provided complete with four (4") inch, lifetime-lubricated, swivel-type casters.
- B. Units shall be sized to roll into Rack Oven, Item No. 44, and Hot Food Holding Unit, Item No. 47 — coordinate accordingly.

4.45 ITEM NO. 46 – RACK**ONE REQUIRED**

Not in Food Service Contract — Future Purchase

- A. Baxter heavy-duty #16-gauge stainless-steel Rack for use with Rack Oven, Item No. 44. Provide, Baxter Model BSRSE-20, complete with three (3") inch ledge spacing and a capacity of twenty (20) pans. Unit shall be fully assembled, welded at factory and provided complete with four (4") inch, lifetime-lubricated, swivel-type casters.
- B. Unit shall be sized to roll into Rack Oven, Item No. 44, and Hot Food Holding Unit, Item No. 47 — coordinate accordingly.

4.46 ITEM NO. 47 – HOT FOOD HOLDING UNIT**ONE REQUIRED**

- A. Victory Model HIS-2D-1-XH. 208 Volt, single-phase operation, complete with grounded cord and plug. Full-length doors shall hinge right/left, as indicated on Contract Drawings. Provide

LED lighting; removable stainless-steel ramps; stainless-steel case back; and extra-high design. Door locks shall be keyed alike with Refrigerator, Item No. 69.

- B. Unit shall accommodate rolling in of Racks, Items No. 45 and/or Item No. 46, all as indicated on Contract Drawings — coordinate accordingly.
- C. Food Service Equipment Contractor shall trim and seal to floor, utilizing #18-gauge stainless-steel angle.
- D. Food Service Equipment Contractor shall interconnect all utilities to Utility Distribution System, Item No. 29.

4.47 ITEM NO. 48 – NOT USED

4.48 ITEM NO. 49 – NOT USED

4.49 ITEM NO. 50 – ICE MAKER WITH BIN

ONE REQUIRED

- A. Manitowoc Model IYT0900A. 208 Volt, single-phase operation, complete with grounded cord and plug. Non-C.F.C. Refrigerant; self-contained, air-cooled operation. Unit shall produce approximately eight-hundred-twenty-five (825) pounds of ice per twenty-four (24) hour period and include LuminIce II Growth Inhibitor System; acoustical ice sensing probe; programmable ice production; EasyTouch display; and half-dice sized cubes. Provide and install unit on Manitowoc Model D970, Ice Storage Bin, complete with Model K00470, Bin Top Adapter, and Model K00461, External Scoop Holder. Unit shall be stainless steel construction and accommodate a minimum of seven-hundred-ten (710) pounds of ice and include six (6") inch high, adjustable, stainless-steel legs with flanged feet. Scoop holder shall be attached to right side of bin at convenient height, via stainless steel "Torx" fasteners.
- B. Food Service Equipment Contractor shall provide and install Water Filter, EverPure InSurlce Twin PF-i 2000 System Model EV9324-22, on building wall to left of assembly, above bin, interconnecting to incoming water line of ice-making inlet. Provide six (6) additional Replaceable Cartridges, Model EV9312-22, and six (6) Pre-Filters, Model EV9534-26.
- C. Food Service Equipment Contractor shall extend drain lines to Floor Trough with Grating, Item No. 51, and direct downward into floor trough.

4.50 ITEM NO. 51 – FLOOR TROUGH WITH GRATING

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Grating shall be IKG Industries, close-mesh stainless-steel grating Type CM-2 (Type 304 Stainless Steel), or approved equal. Bearing bars spaces one-half (½") inch centers, interspacing to be five-sixteenth (5/16") inch. Crossbars spaced on four (4") inch centers. Grating to be size indicated on detail drawing.
- B. Food Service Equipment Contractor shall deliver drain pan to General Contractor for his installation. Food Service Equipment Contractor shall coordinate and cooperate with General Contractor with regard to installation of drain pan. When installed, grating insert shall be flush and level with surrounding kitchen floor. Top and bottom surfaces of grating shall be ground smooth and polished to remove burrs, imperfections, etc.
- C. Food Service Equipment Contractor shall coordinate floor drain to be used by Plumbing Contractor with the fabricated stainless-steel drain pan.

4.51 ITEM NO. 52 – BEVERAGE COUNTER WITH SINK

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Provide stainless-steel drip trough, less stainless-steel grating in size and shape as indicated on Contract Drawings. Provide #14-gauge stainless-steel mounting bracket secured to frame members beneath table top to accommodate attachment of Fill Faucet, Item No. 53, at location indicated on Contract Drawings. Seal to wall.

- B. Food Service Equipment Contractor shall extend drain lines from sink and drip trough to their respective drains, and direct downward into drains.

4.52 ITEM NO. 53 – FILL FAUCET

ONE REQUIRED

- A. T & S Model B-0605-CR. Fill Faucet shall include built-in check valve; vacuum breaker (Model B-0968); 5'-8" long, stainless-steel flexible hose assembly; and hook nozzle with self-closing valve. Fill Faucet shall be securely attached to stainless-steel mounting bracket beneath Beverage Counter with Sink, Item No. 52, at location indicated on Contract Drawings.

4.53 ITEM NO. 54 – COFFEE URN

ONE REQUIRED

- A. Grindmaster/AMW Model 7776. 120/208 Volt, three-phase operation. All Type 304, 18-8 stainless steel construction. Pump-Type Brewing System shall be provided with Twin Six-Gallon Coffee Vessels; one (1) button operation, toggle switch selection for half and full batch; automatic coffee agitation; automatic refill of water compartment; closed chamber brewing; four (4) position temperature selection on thermostat controls; smooth spray arm, with adjustable bypass; Low Water Cutoff System; integral high speed jug fill assembly; and two (2) stainless-steel brew baskets. Coffee Urn shall have control panel on right and be capable of brewing up to sixty-four (64) gallons-per-hour.

4.54 ITEM NO. 55 – UTILITY CART

FOUR REQUIRED

- A. Piper Products 1-UCM-2. Heavy-duty stainless-steel two-shelf unit shall accommodate 1,000 pounds and be provided with #16-gauge square tube all-welded framing; two (2) reinforced stainless-steel shelves; two (2) vertical, non-marking bumpers; two (2), eight (8") inch diameter fixed casters; two (2), eight (8") inch diameter swivel casters; and integral push handle with donut bumpers.

4.55 ITEM NO. 56 – UTILITY CART

TWO REQUIRED

Not in Food Service Contract — Future Purchase

- A. Piper Products 1-UCM-2. Heavy-duty stainless-steel two-shelf unit shall accommodate 1,000 pounds and be provided with #16-gauge square tube all-welded framing; two (2) reinforced stainless-steel shelves; two (2) vertical, non-marking bumpers; two (2), eight (8") inch diameter fixed casters; two (2), eight (8") inch diameter swivel casters; and integral push handle with donut bumpers.

4.56 ITEM NO. 57 – TRAY DELIVERY CART

FIVE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All heavy-duty stainless-steel construction. Cart shall accommodate sixty-eight (68) trays. Food Service Equipment Contractor shall verify specific manufacturer of insulated trays to be used by this facility before fabricating delivery cart. Each cart shall be provided with two (2) 20" x 20", heavy-duty Cambro racks, Model 16C414; three (3) Cambro Model 500LCD, five (5) gallon insulated beverage containers; and four (4), eight (8") inch diameter, heavy-duty pneumatic casters, all swivel with locking brakes. Provide full perimeter, heavy-duty replaceable bumper; and full-size, #20-gauge, double-pan stainless-steel doors, with heavy-duty positive latches. (Note pull-type latches are not acceptable.) Right end of Delivery Cart shall be open for visual security.
- B. Beverage compartment shall be designed to enable beverage containers to be inserted from top or front, with serving access from side. Unit shall include stainless-steel drip trough, less grating, with trough provided with ball valve to prohibit spilling of liquid during transport. Note racks shall be inserted from this end of cart. Note width of delivery cart with corner bumpers shall measure no more than thirty-two-and-one-quarter (32-1/4") inches wide to enable passing through of all openings along delivery route.
- C. Interior frame shall be 1-1/2" x 1-1/2", #12-gauge stainless steel fully welded and polished. Framing shall be reinforced with #16-gauge, Type 304 plate stainless steel at all corners and fittings. Unit shall be framed on all sides, including top and bottom. Cabinet material shall

include minimum #16-gauge, Type 304 stainless steel exterior finishes, with No. 3 finish. Interior shall be minimum #20-gauge, Type 304 stainless steel. Base frame shall be minimum #12-gauge stainless steel reinforced with #12-gauge, Type 304 stainless-steel grade cross channels. Note sides, top, back and bottom, as well as insulated divider, shall be provided with one (1") inch high-density foam insulation.

4.57 ITEM NO. 58 – TRAY DELIVERY CART

TWO REQUIRED

Not in Food Service Contract — Future Purchase

- A. Size and shape as required and as shown on Contract Drawings. All heavy-duty stainless-steel construction. Cart shall accommodate sixty-eight (68) Trays. Verify specific manufacturer of insulated Trays to be used by this facility before fabricating Delivery Cart. Each cart shall be provided with two (2) 20" x 20", heavy-duty Cambro Racks, Model 16C414; three (3) Cambro Model 500LCD, five (5) gallon Insulated Beverage Containers; and four (4), eight (8") inch diameter, heavy-duty pneumatic casters, all swivel with locking brakes. Provide full perimeter, heavy-duty replaceable bumper; and full-size, #20-gauge, double-pan stainless-steel doors, with heavy-duty positive latches. (Note pull-type latches are not acceptable.) Right end of Delivery Cart shall be open for visual security.
- B. Beverage compartment shall be designed to enable beverage containers to be inserted from top or front, with serving access from side. Unit shall include stainless-steel drip trough, less grating, with trough provided with ball valve to prohibit spilling of liquid during transport. Note racks shall be inserted from this end of cart. Note width of Delivery Cart with corner bumpers shall measure no more than thirty-two-and-one-quarter (32-1/4") inches wide to enable passing through of all openings along delivery route.
- C. Interior frame shall be 1-1/2" x 1-1/2", #12-gauge stainless steel fully welded and polished. Framing shall be reinforced with #16-gauge, Type 304 plate stainless steel at all corners and fittings. Unit shall be framed on all sides, including top and bottom. Cabinet material shall include minimum #16-gauge, Type 304 stainless steel exterior finishes, with No. 3 finish. Interior shall be minimum #20-gauge, Type 304 stainless steel. Base frame shall be minimum #12-gauge stainless steel reinforced with #12-gauge, Type 304 stainless-steel grade cross channels. Note sides, top, back and bottom, as well as insulated divider, shall be provided with one (1") inch high-density foam insulation.

4.58 ITEM NO. 59 – POWER POLE

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All #10-gauge stainless-steel construction. Unit shall measure forty-eight (48") inches high and be constructed of #10-gauge stainless steel, complete with brushed finish and all necessary stainless steel internal framing to maximize structural rigidity. Unit shall be provided with base flange around full perimeter to accommodate securing to building floor. Provide flat top and one (1), 120/208 Volt, three-phase receptacle, complete with stainless-steel faceplate to accommodate plugging in of Tray Conveyor, Item No. 60 — coordinate accordingly. Receptacle shall be independently circuited and interconnected to independent electrical feed (by Electrical Contractor) provided through building floor.
- B. Food Service Equipment Contractor shall verify item to be plugged into receptacle and coordinate plug configuration.
- C. Securely attach to building floor with stainless steel fasteners and seal entire perimeter to floor.

4.59 ITEM NO. 60 – TRAY CONVEYOR

ONE REQUIRED

- A. Caddy Corporation Model RCF-Modified. Unit shall be modified to withstand correctional use and installation. Note rollerveyors shall be removable in 3'-0" sections, and secured with stainless steel "Torx" tamper-proof fasteners. Roller Conveyor shall measure approximately 18'-0" long x 19-1/4" wide x 35-1/4" high. Provide #16-gauge stainless-steel bed of all-welded construction, ground smooth, and fully polished. Conveyor bed shall be provided with distinct

pitch to enable cleaning and proper draining of water. Conveyor bed shall be provided with single row of full-width, one-and-one-quarter (1-1/4") inch outer-diameter, stainless-steel rollers with stainless-steel balls in nylon bearings, spaced on approximately three (3") inch centers, with stainless-steel spring-loaded, hexagon, snap-in shafts to accommodate prison-type abuse. Note structural supports shall be stainless steel and welded to underside of conveyor bed. Provide recessed stainless-steel wireway and electric outlets with hinged, moisture-proof covers to accommodate equipment positioned on both sides of conveyor, plus additional receptacles indicated. Wireway shall include integral circuit-breaker panel box, sized to accommodate all electrical requirements of the conveyor and equipment items to be plugged into conveyor. Conveyor shall be wired for 120/208 volt, three phase operation, complete with grounded cord and plug. Note Hot Food Counters, Items No. 61, and Milk Cabinet, Item No. 62, shall plug into compatible receptacles within electrical raceway — coordinate accordingly. Additional convenience outlets, complete with flush-mounted stainless-steel faceplates and ivory-colored receptacles shall be positioned on raceway at locations indicated on Contract Drawings.

- B. Entire conveyor shall be mounted on #16-gauge, one-and-five-eighth (1-5/8") inch outer-diameter, stainless steel tubing, complete with lateral and longitudinal cross bracing of one-and-one-quarter (1-1/4") inch, outer-diameter stainless steel, completely welded and finished with heavy-duty, five (5") inch diameter, polyurethane-tired swivel casters. Casters at each end shall be provided with foot brakes. Provide additional stainless-steel support framing, full-length of pitched stainless-steel drip pan, and all modifications necessary to accommodate prison abuse.
- C. Food Service Equipment Contractor shall verify particular trays to be used by this facility and coordinate, as required, with roller conveyor specifics.
- D. Note unit shall plug into compatible receptacle mounted within adjacent Power Pole, Item No. 59 — coordinate accordingly.

4.60 ITEM NO. 61 – HOT FOOD COUNTER

TWO REQUIRED

- A. Caddy Model TF-613-Modified. 208 Volt, single-phase operation, complete with grounded cord and plug. Unit shall be modified, as required, to withstand prison-type abuse. Unit shall match height of Tray Conveyor, Item No. 60. All wells shall be provided with drains for wet usage complete with manifolded drain line. Food Service Equipment Contractor shall extend drain line to floor drain. Provide four (4), five (5") inch diameter, swivel casters, each with wheel locks. Provide full-length, #16-gauge stainless-steel undershelf and full perimeter bumper. Provide one (1") inch diameter, stainless steel push-handle with doughnut bumpers. Note push-handle shall be provided on right end of one (1) unit and left end of one (1) unit. Note units shall plug into compatible receptacles mounted within Tray Conveyor, Item No. 60 — coordinate accordingly.

4.61 ITEM NO. 62 – MILK CABINET

ONE REQUIRED

- A. Continental Model MC3-D-SS. 120 Volt, single-phase operation, complete with grounded cord and plug. Non-C.F.C. refrigerant, self-contained, air-cooled operation. Dual access, forced-air design, with eight (8) case capacity. Provide stainless-steel interior and exterior; four (4), five (5") inch diameter, heavy-duty casters, two (2) swivel with locking brakes; corner bumpers and heavy-duty, hasp-type, lid-locking assembly.
- B. Note unit shall plug into compatible receptacle mounted within Tray Conveyor, Item No. 60 — coordinate accordingly.

4.62 ITEM NO. 63 – COLD FOOD COUNTER

TWO REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Provide four (4), five (5") inch diameter, heavy-duty casters, two (2) swivel with locking brakes. Note unit height shall match that of Tray Conveyor, Item No. 60.

4.63 ITEM NO. 64 – WORK TABLE WITH SINK**ONE REQUIRED**

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Seal entire assembly to building wall and provide flanged feet, securely attaching to building floor to prohibit movement of table.
- B. Food Service Equipment Contractor shall extend drain line to floor sink and direct downward into floor sink.

4.64 ITEM NO. 65 – EQUIPMENT STAND**ONE REQUIRED**

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Provide four (4), five (5") inch diameter, heavy-duty casters, two (2) swivel with locking brakes. Note Toaster, Item No. 66, shall be securely attached to unit with stainless steel "Torx" tamper-proof screws.

4.65 ITEM NO. 66 – CONVEYOR TOASTER**ONE REQUIRED**

- A. Hatco Model TK-72-Modified. 208 Volt, single-phase operation, complete with grounded cord and plug. Unit shall accommodate toasting of bread and buns at approximately twelve (12) slices per minute. Provide stainless steel flanged feet and securely attach to Equipment Stand, Item No. 65.
- B. Unit shall plug into building wall or receptacle mounted within Tray Conveyor, Item No. 60 – coordinate accordingly.

4.66 ITEM NO. 67 – EQUIPMENT STAND**ONE REQUIRED**

Not in Food Service Contract — Future Purchase

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Provide four (4), five (5") inch diameter, heavy-duty casters, two (2) swivel with locking brakes. Note Toaster, Item No. 66, shall be securely attached to unit with stainless steel "Torx" tamper-proof screws.

4.67 ITEM NO. 68 – CONVEYOR TOASTER**ONE REQUIRED**

Not in Food Service Contract — Future Purchase

- A. Hatco Model TK-72-Modified. 208 Volt, single-phase operation, complete with grounded cord and plug. Unit shall accommodate toasting of bread and buns at approximately twelve (12) slices-per-minute. Provide stainless steel flanged feet and securely attach to Equipment Stand, Item No. 67.
- B. Unit shall plug into building wall or receptacle mounted within Tray Conveyor, Item No. 60 – coordinate accordingly.

4.68 ITEM NO. 69 – REFRIGERATOR**ONE REQUIRED**

- A. Victory Model RIS-2D-S7. 120 Volt, single phase operation, complete with grounded cord and plug. Non-C.F.C. refrigerant, self-contained, air-cooled operation. Full-length doors shall hinge left/left, as indicated on Contract Drawings. Provide LED lighting; removable stainless-steel and ramps. Trim and seal to floor, wall, and adjacent equipment utilizing #18-gauge stainless-steel angle. Door locks shall be keyed alike with Hot Food Holding Unit, Item No. 47.
- B. Note unit shall accommodate rolling in of Racks, Items No. 70, as indicated on Contract Drawings — coordinate accordingly.

4.69 ITEM NO. 70 – RACK**THREE REQUIRED**

- A. New Age high-tensile, all-welded aluminum construction rack, complete with four (4), five (5") inch diameter, platform-type swivel casters and corner bumpers. Provide two (2) angle-type racks, Model 1338, with eighteen (18) sets of slides spaced on three (3") inch centers; and one (1) Universal Angle-Type Rack, Model 1635, with twelve (12) sets of angle slides spaced on four-and-one-half (4-1/2") inch centers. Note units shall be sized to roll into Hot Food Holding

Cabinet, Item No. 47, and Refrigerator, Item No. 69 — coordinate accordingly.

4.70 ITEM NO. 71 – RACK

ONE REQUIRED

Not in Food Service Contract — Future Purchase

- A. New Age High-Tensile, All-Welded Aluminum Construction Rack, complete with four (4), five (5") inch diameter, platform-type swivel casters and corner bumpers. Provide Universal Angle-Type Rack, Model 1635, with twelve (12) sets of angle slides spaced on four-and-one-half (4-1/2") inch centers. Note unit shall be sized to roll into Hot Food Holding Cabinet, Item No. 47, and Refrigerator, Item No. 69 — coordinate accordingly.

4.71 ITEM NO. 72 – NOT USED

4.72 ITEM NO. 73 – NOT USED

4.73 ITEM NO. 74 – SOILED DISH TABLE WITH SCRAP BASKETS

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Seal to dishwasher and walls with watertight connections. Provide twenty-two (22") inch square x eight (8") inch deep pre-rinse sink, with two (2), #16-gauge half-size x three (3") inch high, perforated stainless-steel baskets with integral rack, and one (1") inch flange at exposed perimeter to fully encompass sink bowl. When installed, assembly shall accommodate sliding over of dish racks to accommodate pre-washing function. Provide eight (8") inch diameter openings in table top, directly above trash receptacles (provided by Owner) at locations indicated — coordinate accordingly.
- B. Food Service Equipment Contractor shall extend drain line from sink to floor sink and direct downward into floor sink.

4.74 ITEM NO. 75 – HOSE REEL WITH CONTROL PANEL

ONE REQUIRED

- A. T&S Model B-2339-2339-L. Unit shall be provided with enclosed Hose Reel with thirty (30'-0") feet of hose; high flow spray valve; rinse control cabinet with control valve; dual check valves; thermometer; water hammer arrester; and all required components. Note Control Panel shall be recess-mounted in building wall approximately four (4") inches above backsplash of Soiled Dish Table with Scrap Baskets, Item No. 74, at location indicated on Contract Drawings — fully coordinate with General Contractor. Hose Reel shall be mounted at convenient height centered directly above pre-wash sink. Food Service Equipment Contractor shall fully interconnect between control unit and Hose Reel, utilizing chrome-plated piping on all exposed sections.

4.75 ITEM NO. 76 – DISHWASHER W/BOOSTER HEATER & BLOWER DRYER

ONE REQUIRED

- A. Hobart Model CL64eN-EGR/BD. Left-to-right operation. Motors, controls and heating elements shall be wired for 480 volt, three-phase operation. Provide single-point electrical connection, stainless-steel splash shield at load end, and nineteen-and-one-half (19-1/2") inch chamber height opening. Provide and install Table Limit Switch, Banner Model T18RW3L, Retro-Reflector Photo Sensor and Reflector mounted within backsplash and dish edge of adjoining Clean Dish Table/Scullery Sink, Item No. 77, positioned approximately six (6") inches in advance of left-hand sink bowl, fully interwired by Food Service Equipment Contractor. Three-hundred-forty-two (342) rack-per-hour capacity; Energy Saver Mode; service diagnostics; stainless-steel anti-clogging wash arms, self-draining pump, impeller, enclosure panels, and insulated hinged doors; and drain water energy recovery system. Provide integral 30KW stainless-steel pressureless booster heater independently wired for 480 volt, three-phase operation to provide a minimum 70°Fahrenheit temperature rise. Provide all valves, controls, and shock absorber for water hammer, as well as the required temperature/pressure gauges; one (1) on incoming line and one (1) on outgoing line. Provide Model CLe, all Electric Blower Dryer, measuring thirty-three (33") inches long, installed at unload end of Dishwasher, independently wired for 480 volt, three-phase operation, operating in a left-to-right manner. Food Service Equipment Contractor shall bolt chamber to Dishwasher, fully interconnecting to enable seamless rack operation through Dishwasher and Blower Dryer. Unit shall include

thermostatic control and separate over temperature protection. Motor shall be provided with splashproof enclosure and include 120 volt transformer for controls.

- B. Food Service Equipment Contractor shall extend drain lines to floor sink and direct downward into floor sink.
- C. Provide the following racks:
 - 1. Eight (8) Combination Racks, Cambro Model BR258.
 - 2. Eight (8) All-Purpose Racks, Cambro Model PR314.
 - 3. Four (4) Sheet Pan Racks, Hobart Model SHTPAN-Rack.
- D. Provide and install two (2) Hobart vent hoods, one (1) on load end and one (1) integral within blower dryer section. Vent openings shall measure 4" x 16". Provide #18-gauge stainless-steel vent ducts of sufficient length to extend from top of Dishwasher to approximately six (6") inches above finished ceiling where they will be interconnected into the ventilating system by the HVAC Contractor. Ducts shall have both watertight and vaportight connections at joints and at vent exhaust connections.
- E. Provide and install thermostatically-controlled Dishwater Tempering Kit to permit cold water to mix with discharge water prior to entering floor sink to reduce water temperature to below 140°Fahrenheit.
- F. Provide vent switch, as required, for interconnecting Dishwasher to exhaust fan. Interconnection shall be the responsibility of the Mechanical Contractor.
- G. Food Service Equipment Contractor shall provide and install Water Conditioner, EverPure KleenWare Model HTS-11, securely attached to building wall to right of assembly and interconnected to incoming water line of booster heater by Food Service Equipment Contractor, complete with six (6) additional replacement cartridges, Model HT-10.

4.76 ITEM NO. 77 – CLEAN DISH TABLE / SCULLERY SINK

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Seal to Dishwasher and walls with watertight connections. Note limit switch from Dishwasher shall be installed within dish edge and backsplash of table at location indicated and fully interconnected by Food Service Equipment Contractor.
- B. Food Service Equipment Contractor shall extend drain lines from sinks to floor sink, directing downward into floor sink.

4.77 ITEM NO. 78 – EYEWASH / FACEWASH STATION

ONE REQUIRED

- A. T & S Model EW-7360B. Wall-mounted unit shall be provided complete with chrome-plated brass stay-open ball valve; water inlet; waste outlet; and emergency thermostatic mixing valve. Unit shall be securely attached to building wall at compliant height within Dishwashing Area at location indicated on Contract Drawings. Seal to wall.

4.78 ITEM NO. 79 – HAND SINK (ADA COMPLIANT)

ONE REQUIRED

- A. Advance Model 7-PS-25-Modified. Provide heavy-duty T & S deck-mounted fixed faucet assembly; wrist-action valves; stainless-steel wall-mounting brackets; and fixed strainer plate. Securely attach and seal to building wall at ADA-compliant height.

4.79 ITEM NO. 80 – POT AND PAN RACK

TWO REQUIRED

- A. New Age Model 1066-M6, heavy-duty, all-welded four-shelf mobile unit, complete with 1-1/2" x 1-1/2" x .070" fully welded tubing, complete with four (4), six (6") inch, heavy-duty platform casters with 1,500-pound per shelf capacity. Unit shall measure 48" long x 24" wide x 72" high.

4.80 ITEM NO. 81 – BEVERAGE CONTAINER DRYING RACK

ONE REQUIRED

- A. New Age Model 1066-M6, heavy-duty, all-welded four-shelf mobile unit, complete with 1-1/2" x 1-1/2" x .070" fully welded tubing, complete with four (4), six (6") inch, heavy-duty platform casters with 1,500-pound per shelf capacity. Unit shall measure 48" long x 24" wide x 72" high.

4.81 ITEM NO. 82 – BEVERAGE CONTAINER DRYING RACK**ONE REQUIRED**

Not in Food Service Contract — Future Purchase

- A. New Age Model 1066-M6, heavy-duty, all-welded four-shelf mobile unit, complete with 1-1/2" x 1-1/2" x .070" fully welded tubing, complete with four (4), six (6") inch, heavy-duty platform casters with 1,500-pound per shelf capacity. Unit shall measure 48" long x 24" wide x 72" high.

4.82 ITEM NO. 83 – TRAY DRYING RACK**THREE REQUIRED**

- A. Jones Zylon Model JZDRA-92. Unit shall be all-welded aluminum corrections grade construction, and accommodate one-hundred-and-eighty-four (184) insulated trays and covers. Provide full complement of Model JZDRI-3, three (3") inch slot width, co-polymer, shatterproof, dishwasher safe inserts; and four (4), six (6") inch diameter, poly swivel casters with brakes.
- B. Food Service Equipment Contractor shall verify specific insulated trays to be utilized by this facility and coordinate configuration/accessories for Drying Racks.

4.83 ITEM NO. 84 – TRAY DRYING RACK**ONE REQUIRED**

Not in Food Service Contract — Future Purchase

- A. Jones Zylon Model JZDRA-92. Unit shall be all-welded aluminum corrections grade construction, and accommodate one-hundred-and-eighty-four (184) insulated trays and covers. Provide full complement of Model JZDRI-3, three (3") inch slot width, co-polymer, shatterproof, dishwasher safe inserts; and four (4), six (6") inch diameter, poly swivel casters with brakes.
- B. Verify specific insulated trays to be utilized by this facility and coordinate configuration/accessories for drying rack.

4.84 ITEM NO. 85 – FLOOR TROUGH WITH GRATING**ONE REQUIRED**

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Grating shall be IKG Industries, close-mesh stainless steel grating Type CM-2 (Type 304 Stainless Steel), or approved equal. Bearing bars spaced one-half (1/2") inch centers, interspacing to be five-sixteenth (5/16") inch. Crossbars spaced on four (4") inch centers. Grating to be size indicated on detail drawing.
- B. Food Service Equipment Contractor shall deliver drain pan to General Contractor for this installation. Food Service Equipment Contractor shall coordinate and cooperate with General Contractor with regard to installation of drain pan. When installed, grating inserts (minimum of four) shall be flush and level with surrounding kitchen floor. Top and bottom surfaces of grating shall be ground smooth and polished to remove burrs, imperfections, etc.
- C. Food Service Equipment Contractor shall coordinate floor drain to be used by Plumbing Contractor with the fabricated stainless-steel drain pan.

4.85 ITEM NO. 86 – WASH DOWN STATION**ONE REQUIRED**

- A. T&S Model MV-0771-12CW. Assembly shall include three-quarter (3/4") inch hot and cold water inlets; matching three-quarter (3/4") inch globe valves with color-coded handles; hose swivel; check valves, unions; bi-metallic thermometer with stainless steel case; stainless steel hose mounting rack; fifty (50'-0") feet of three-quarter (3/4") inch white hose assembly; and stainless steel, rear trigger water gun with rubber cover. Assembly shall be securely attached to wall within Cart Wash Room utilizing stainless steel "Torx" fasteners, and interconnected to detergent containers (provided and installed by Chemical Supplier).

4.86 ITEM NO. 87 – JANITOR'S SINK**ONE REQUIRED**

Not in Food Service Contract — By Plumbing Contractor

4.87 ITEM NO. 88 – HOSE FAUCET**ONE REQUIRED**

Not in Food Service Contract — By Plumbing Contractor

STAFF DINING AREA

4.88 ITEM NO. 101 – REFRIGERATOR

ONE REQUIRED

- A. Victory Model RS-1D-S1. 120 Volt, single-phase operation, complete with grounded cord and plug. Non-C.F.C. refrigerant, self-contained, air-cooled operation. Full length door shall hinge left, as shown on Contract Drawings. Provide heavy-duty wire shelves, plus two (2) additional shelves; LED lights; four (4), five (5") inch diameter, heavy-duty swivel casters, two (2) front with locking brakes; and door lock.

4.89 ITEM NO. 102 – SERVING COUNTER WITH SINK

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless steel construction. Semi-enclosed stainless steel design with #14-gauge stainless steel top. Counter shall be tightly constructed around offset in wall at left end, as indicated on Contract Drawings. Rear of counter shall abut building wall, include backsplash, and be fully sealed to walls, as indicated on Contract Drawings. Entire counter shall be installed on six (6") inch high, adjustable, stainless-steel bullet feet. Right end of assembly shall be reduced height, with an extended backsplash (matching balance of counter height) to accommodate positioning of trays, as indicated on Contract Drawings. Provide stainless steel, lockable hinged doors directly in front of condensing unit for Refrigerated Cold Pan, Item No. 108, to provide adequate ventilation for system as per manufacturer's requirements.
- B. Tray slide shall be #14-gauge stainless steel and shall extend length of counter with chamfered ends. Solid type, set below the counter top so that the back of the tray slide shall turn up under counter top. Tray slide shall be securely attached to counter framing.
- C. Hot Food Section shall be provided with three (3) Hot Food Wells, Wells Model BMW-206 ULSTD. One (1) piece, die-stamped stainless steel, installed per manufacturer's printed instructions with inverted "V" edge around perimeter of each well. Each well shall be provided with easily accessible shutoff valve, all manifolded and extended to floor drain. Each well shall be individually controlled and provided with thermostatic signal light. All wiring shall be extended to commercial-grade, U.L. Approved disconnect switch within counter, awaiting final connection by Electrical Contractor. Food Service Equipment Contractor shall provide necessary cut-out, complete with grommet in counter, as required, to accommodate extending of utilities. Wells shall be wired for 208 volt, single-phase operation, with controls installed behind lockable stainless-steel door below hot food well location. Door shall be provided with hasp-type lock assembly with padlock provided by Owner.
- D. Provide the following listed Vollrath stainless steel pans and covers as part of this specification:
 - 1. Three (3) Model 3004-5, Full-Size Pans.
 - 2. Six (6) Model 3024-5, Half-Size Pans.
 - 3. Three (3) Model 77200, Dome Covers.
- E. Counter shall be provided with single pantry Fill Faucet, T&S Model B-0305-PF96H-CR, for filling of hot food wells. Fill Faucet shall be securely attached to door with single-pantry valve securely attached to frame members of serving counter. Provide vacuum breaker; 2.2-gpm spray valve with auto shut-off; finger hook; backflow preventer, and minimum 6'-0" long, flexible, food-grade, stainless-steel hose in lieu of standard hose to accommodate filling of each well.
- F. Provide necessary cutout in counter to accommodate installation of Refrigerated Cold Pan, Item No. 108, at location indicated on Contract Drawings.
- G. Provide four (4") inch wide drip trough in counter, less stainless-steel grating in size and shape as indicated on Contract Drawings.

- H. Food Service Equipment Contractor shall extend drain lines from sink and drip trough to floor sink and direct downward into floor sink.

4.90 ITEM NO. 103 – BREATH GUARD

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Note breath guard shall be securely attached to building wall above hot and cold food sections of Serving Counter, Item No. 102, at location indicated on Contract Drawings. Note overhang at front shall comply with local Health Department Code Standards. All glass shall be three-eighth (3/8") inch tempered type with #18-gauge stainless steel trim. Unit shall be provided with additional one-and-one-quarter (1-1/4") inch square, stainless-steel legs at front, extended down through countertop and welded to channel members of serving counter frame to maximize rigidity.

4.91 ITEM NO. 104 – WALL SHELF

ONE REQUIRED

- A. Size and shape as required and as shown on Contract Drawings. All stainless-steel construction. Unit shall be securely attached to wall above Serving Counter, Item No. 102, at location indicated on Contract Drawings and sized to accommodate installation and positioning of Microwave Oven, Item No. 105. Seal to wall.

4.92 ITEM NO. 105 – MICROWAVE OVEN

ONE REQUIRED

- A. Sharp Model R-22GTF. 120 Volt, single-phase operation, complete with grounded cord and plug. Provide stainless-steel interior and exterior; 0.7 cubic feet capacity; 1,200 watt output power; and ten (10) variable power levels.

4.93 ITEM NO. 106 – ICE MAKER / ICE AND WATER DISPENSER

ONE REQUIRED

- A. Manitowoc Model CNF0202A. 120 Volt, single-phase operation, complete with grounded cord and plug. Non-C.F.C. refrigerant, air-cooled, self-contained operation. Unit shall produce approximately two-hundred fifty (250) pounds of ice per twenty-four (24) hour period and accommodate twenty (20) pounds of ice storage. Unit shall provide nugget ice only, water only, or ice and water, with "touch free" activation of each. All stainless-steel construction, with full complement of six (6") inch high, adjustable legs (K-00345).
- B. Food Service Equipment Contractor shall extend drain through the Serving Counter with Sink, Item No. 102, directing drain line downward into floor drain.
- C. Food Service Equipment Contractor shall provide and install Water Filter, EverPure InSurIce Single PF-i 2000 System Model EV9324-21, on building wall to the right of assembly interconnecting to incoming water line of ice-making and water inlets. Provide a total of six (6) additional Replaceable Cartridges, Model EV9312-22, and six (6) Pre-Filters, Model EV9634-26.

4.94 ITEM NO. 107 – COFFEE BREWING SYSTEM

ONE REQUIRED

- A. Bunn Model Dual 20900.0010. 120/208 Volt, single-phase operation. Provide two (2) stainless steel Brew Baskets; shatterproof gauge glass; three (3) programmable portion settings from half-gallon to 1-1/2 gallons; low-temp/no-brew indicator; two (2) Bunn Model 1.5GPR Portable Servers, and five-hundred (500) additional Filter Papers.

4.95 ITEM NO. 108 – REFRIGERATED COLD PAN

ONE REQUIRED

- A. Hatco Model CWB-3. 120 Volt, single-phase operation, complete with grounded cord and plug. Non-C.F.C. refrigerant, self-contained air-cooled operation. NSF 7 compliant. Slope top unit with low end facing patrons. Unit shall be installed within Serving Counter with Sink, Item No. 102, at location indicated on Contract Drawings. Provide "On/Off" switch behind lockable hinged door within serving counter, beneath tray slide, all interwired and interconnected with cold pan by Food Service Equipment Contractor. Provide two-piece stainless-steel perforated false bottom, pan support bars, and slant kit (installed with low end at patron's side). Food Service Equipment Contractor shall coordinate installation and required air louvers within

counter to insure proper ventilation of condensing unit.

- B. Food Service Equipment Contractor shall extend drain line to floor drain and direct downward into floor drain.

4.96 ITEM NO. 109 – HOT / COLD TRANSPORT CART

ONE REQUIRED

- A. Cambro Combo Cart® Model CMB1826L. Unit shall be constructed of double-wall, molded polyethylene, with foamed-in-place polyethylene insulation; air-tight gasket; 270° full-swing door; molded-in full-length handle; vent cap; two (2), five (5") inch diameter, heavy-duty swivel casters with brakes; and two (2), ten (10") inch diameter easy-wheels. Unit shall accommodate twelve (12), 18" x 26" sheet pans, or twelve (12), 12" x 20" x 2-1/2" deep pans. Gray color.

4.97 ITEM NO. 110 – TRASH RECEPTACLE

ONE REQUIRED

Not in Food Service Contract — By Owner

4.98 ITEM NO. 111 – SOILED TRAY CART

ONE REQUIRED

- A. CresCor Model 2213-1824B-Modified. Unit shall be modified, as required, with angle slides designed to accommodate staff dining trays, spaced on five-and-one-eighth (5-1/8") inches centers. Unit shall be all extruded aluminum welded construction, complete with corner bumpers; four (4), five (5") inch diameter, heavy-duty swivel casters, two (2) front with locking brakes. Provide matching side, back and bottom enclosures.
- B. Food Service Equipment Contractor shall verify size and shape of trays to be utilized by staff at this facility and coordinate angle slide spacing and sizing.

4.99 ITEM NO. 112 – BEVERAGE CONTAINER

TWO REQUIRED

- A. Cambro Model 250LCD. Two-and-one-half (2-1/2) gallon capacity. Provide riser for each unit and black color.

4.100 ITEM NO. 113 – CONVEYOR TOASTER

ONE REQUIRED

- A. Hatco Toast-Qwik Model TQ3-400. 120 Volt, single-phase operation, complete with grounded cord and plug. Unit shall accommodate toasting of bread, buns, and bagels, and be provided with touchscreen controller; twelve (12) programmable settings; ColorGuard Sensing System; Power Save mode; removable crumb tray; and black color.

ADDITIONAL ACCEPTABLE MANUFACTURERS

The following listed manufacturers may be considered as acceptable alternates; however, the specified manufacturer's make and model number establishes the minimum required standards. All equipment, capacities, warranties, and specific accessories specified within the named manufacturer's make and model number must be provided with the following listed manufacturers. All additional costs incurred in order to provide the above-mentioned equipment and warranties shall be considered a part of this specification.

MAIN KITCHEN

ITEM NO. 1 – AMERICAN PANEL (CUSTOM)

ITEM NO. 1A & 1B – BOHN/COPELAND, COLDZONE, COOLTEC

ITEM NO. 2 – AMERICAN PANEL (CUSTOM)

ITEM NO. 2A & 2B – BOHN/COPELAND, COLDZONE, COOLTEC

ITEM NO. 3 – CHANNEL

ITEM NO. 4 – NOT IN FOOD SERVICE CONTRACT

ITEM NO. 5 – CHANNEL
ITEM NO. 6 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 7 – NEW AGE, CHANNEL
ITEM NO. 8 – NOT USED
ITEM NO. 9 – IMC/TEDDY, FABRICATED
ITEM NO. 10 – NOT USED
ITEM NO. 11 – NOT USED
ITEM NO. 12 – EAGLE, JOHN BOOS
ITEM NO. 13 – FABRICATED
ITEM NO. 14 – NO ALTERNATE
ITEM NO. 15 – FABRICATED
ITEM NO. 16 – NO ALTERNATE
ITEM NO. 17 – FABRICATED
ITEM NO. 18 – FABRICATED
ITEM NO. 19 – FABRICATED
ITEM NO. 20 – FABRICATED
ITEM NO. 21 – NO ALTERNATE
ITEM NO. 22 – FABRICATED
ITEM NO. 23 – FABRICATED
ITEM NO. 24 – GLOBE
ITEM NO. 25 – FABRICATED
ITEM NO. 26 – FABRICATED
ITEM NO. 27 – NO ALTERNATE
ITEM NO. 28 – NOT USED
ITEM NO. 29 – NO ALTERNATE
ITEM NO. 30 – VULCAN, KEATING
ITEM NO. 31 – GROEN, LEGION
ITEM NO. 32 – FABRICATED
ITEM NO. 33 – FISHER, CHICAGO
ITEM NO. 34 – NO ALTERNATE
ITEM NO. 35 – FABRICATED
ITEM NO. 36 – GROEN
ITEM NO. 37 – NO ALTERNATE
ITEM NO. 38 – KEATING, PITCO, DEAN
ITEM NO. 39 – VULCAN, JADE
ITEM NO. 40 – BLODGETT, VULCAN
ITEM NO. 41 – NO ALTERNATE
ITEM NO. 42 – KIDDE, RANGE GUARD

ITEM NO. 43 – IRINOX, AMERICAN PANEL
ITEM NO. 44 – NO ALTERNATE
ITEM NO. 45 – NO ALTERNATE
ITEM NO. 46 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 47 – CONTINENTAL, TRAULSEN
ITEM NO. 48 – NOT USED
ITEM NO. 49 – NOT USED
ITEM NO. 50 – SCOTSMAN, HOSHIZAKI, FOLLETT
ITEM NO. 51 – FABRICATED
ITEM NO. 52 – FABRICATED
ITEM NO. 53 – FISHER, CHICAGO
ITEM NO. 54 – FETCO (CUSTOM)
ITEM NO. 55 – LAKESIDE, FABRICATED
ITEM NO. 56 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 57 – FABRICATED
ITEM NO. 58 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 59 – FABRICATED
ITEM NO. 60 – PIPER, TRAYCON, GATES
ITEM NO. 61 – PIPER, FABRICATED
ITEM NO. 62 – BEVERAGE-AIR, TRAULSEN
ITEM NO. 63 – FABRICATED
ITEM NO. 64 – FABRICATED
ITEM NO. 65 – FABRICATED
ITEM NO. 66 – SAVORY, APW/WYOTT
ITEM NO. 67 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 68 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 69 – CONTINENTAL, TRAULSEN
ITEM NO. 70 – CRESCOR, CHANNEL
ITEM NO. 71 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 72 – NOT USED
ITEM NO. 73 – NOT USED
ITEM NO. 74 – FABRICATED
ITEM NO. 75 – CHICAGO
ITEM NO. 76 – NO ALTERNATE
ITEM NO. 77 – FABRICATED
ITEM NO. 78 – BRADLEY, ENCON
ITEM NO. 79 – EAGLE, JOHN BOOS
ITEM NO. 80 – CHANNEL

ITEM NO. 81 – CHANNEL
ITEM NO. 82 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 83 – FABRICATED
ITEM NO. 84 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 85 – FABRICATED
ITEM NO. 86 – NO ALTERNATE
ITEM NO. 87 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 88 – NOT IN FOOD SERVICE CONTRACT

STAFF DINING

ITEM NO. 108 – WELLS, DELFIELD
ITEM NO. 109 – NO ALTERNATE
ITEM NO. 110 – NOT IN FOOD SERVICE CONTRACT
ITEM NO. 111 – PIPER, CHANNEL, FABRICATED
ITEM NO. 112 – NO ALTERNATE
ITEM NO. 113 – SAVORY, APW/WYOTT

END OF SECTION

SECTION 12 2400 WINDOW SHADES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Interior manual roller shades.

1.03 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

1.04 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
- B. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.06 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- B. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, operation direction, and location of operating devices.
- C. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.
- D. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- E. Selection Samples: Include fabric samples in full range of available colors and patterns.
- F. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- I. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

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

- B. Installer Qualifications: Company specializing in performing work of this type with minimum three years of experience with shading systems of similar size and type.
 - 1. Factory training and demonstrated experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 MOCK-UP

- A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams when applicable.
 - 1. Obtain Architect's approval of light and privacy characteristics of fabric prior to fabrication.
 - 2. Full-sized mock-up may become part of the final installation.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.10 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.11 WARRANTY

- A. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: Ten years.
 - 2. Standard Shade Cloth: Five years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Interior Manually Operated Roller Shades:
 - 1. MechoShade Systems LLC;; Mecho/5 System (Basis of Design): www.mechoshade.com/#sle.
 - 2. Draper, Inc; Clutch Operated FlexShade: www.draperinc.com/#sle.
 - 3. Hunter Douglas Architectural; RB500 Manual Roller Shades: www.hunterdouglasarchitectural.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROLLER SHADES

- A. General:
 - 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 - 2. Provide shade system that operates smoothly when shades are raised or lowered.
- B. Roller Shades:
 - 1. Description - Interior Roller Shades: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Roll Direction: Roll down, closed position is at window sill.
 - c. Mounting: Ceiling mounted.
 - d. Size: As indicated on drawings.
 - e. Fabric: As indicated under Shade Fabric article..

2.03 SHADE FABRIC

- A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Manufacturers:
 - a. MechoShade Systems LLC (Basis of Design): www.mechoshade.com/#sle.
 - b. Draper, Inc: www.draperinc.com/#sle.
 - c. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Material: Vinyl coated polyester.
 - 3. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - 4. Openness Factor: 3 percent.
 - 5. Weight: As selected by the Architect from manufacturers selection based on openness factor and colors.
 - 6. Roll Width: 72 inches.
 - 7. Color: As selected by Architect from manufacturer's full range of colors.
 - 8. Fabrication:
 - a. If height of opening requires multiple panels of railroaded fabric, use manufacturer's standard sewn seams.

2.04 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 - 1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 - 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
 - 3. Horizontal Dimensions - Outside Mounting: Cover window frames, trim, and casings completely.
- C. Dimensional Tolerances: As recommended in writing by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.

3.06 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 12 5500
DETENTION FURNITURE**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. This Section includes detention furniture, furnishings and equipment.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete for building anchors into concrete construction.
- B. Section 05 0527 - SECURITY METAL FASTENERS.
- C. Section 07 9200 - Joint Sealants.
- D. Section 08 7163 - Detention Door Hardware for locks and cylinders.
- E. Section 09 9600 - High-Performance Coatings.
- F. Section 13 4263 - PRECAST CONCRETE DETENTION CELL MODULES.

1.04 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- B. ASTM A513/A513M - Steel Tubing; Type B, unless otherwise indicated; thickness indicated or required by structural loads.
- C. ASTM A53/A53M - Steel Pipe; Standard Weight (Schedule 40), unless another weight is indicated or required by structural loads.
- D. ASTM A666 - Stainless-Steel Sheet, Strip, Plate, and Flat Bars, Type 304.

1.05 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of detention furnishing indicated.
- B. Shop Drawings: For each type of detention furnishing. Include plans, elevations, sections, details, and attachments to other Work.
- C. Coordination Drawings: Drawings of each built-in anchor supporting detention furnishings, including those to be installed as work of other Sections, drawn to scale and coordinating anchorage with detention furnishings. Show the following:
 - 1. Locations, dimensions, and profiles of wall and floor reinforcements.
 - 2. Locations and installation details of built-in anchors.
 - 3. Elevations of each detention furnishing showing dimensions of furnishing, preparations for receiving anchors, and locations of anchorage.
 - 4. Details of attachment of each detention furnishing to built-in anchors.
- D. Samples for Initial Selection: For each type of detention furnishing with factory-applied color finishes.
- E. Product Certificates: For each type of detention furnishing, signed by product manufacturer.
- F. Welding certificates.
- G. Qualification Data: For Installer and manufacturer.
- H. Maintenance Data: For detention lockers and cabinets to include in maintenance manuals.
- I. Warranties: Sample of special warranties specified in this Section.

- J. 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.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of detention furnishing manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain each type and variety of detention furnishing through one source from a single manufacturer, unless otherwise indicated.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of detention furnishings and are based on the specific system indicated. Refer to Division 01.
 - 1. Do not modify intended security performance and aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Welding: 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."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys of detention furniture to Owner.

1.08 PROJECT CONDITIONS

- A. Field Measurements: Verify openings for recessed detention furnishings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.09 COORDINATION

- A. Coordinate installation of anchorages for detention furnishings. 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.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detention furnishings that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including deflection exceeding 1/4 inch.
 - 2. Faulty operation of hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal detention use.
- B. Warranty Period: Two years from date of Substantial Completion.

1.11 MAINTENANCE TOOLS

- A. Tool Kit: Provide six sets of tools for use with security fasteners, each packaged in a compartmented kit configured for easy handling and storage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: In addition to the manufacturers listed for the products below and 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. American Jail Products, LLC.
2. Bob Barker Company, Inc.
3. Jails Correctional Products.
4. Maximum Security Products Corp.
5. Norix Group, Inc.
6. Sweeper Metal Fabricators Corp.

2.02 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: ASTM A568/A568M, Type B, unless otherwise indicated.
- C. Steel Tubing: ASTM A513/A513M, Type B, unless otherwise indicated; thickness indicated or required by structural loads.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40), unless another weight is indicated or required by structural loads.
- E. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666, Type 304.
- F. Security Fasteners: Comply with Section 05 0527.
- G. Embedded Plate Anchors: Fabricated from steel shapes and plates, minimum 3/16 inch thick; with minimum 1/2-inch- diameter, headed studs welded to back of plate, unless indicated otherwise.
- H. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.03 DETENTION LOCKERS AND CABINETS

- A. Pistol Locker:
 1. Basis of Design: Norix, Model IPL600.
 2. Material: Cabinet shall be constructed of 7 gauge steel with 7 gauge bent steel plate doors.
 3. Compartments: 15 1/2 inches wide x 8 1/2 inches deep x 5 1/4 inches high, number of compartment as noted on drawings.
 4. Hinges: Continuous type.
 5. Locks: Individual spring locks, keyed separately and master keyed.
- B. Key Cabinet:
 1. Detention quality key cabinet shall hold 300 paracentric or mogul keys.
 2. Material: Cut, formed and welded 10 gauge steel, including two hinged inside panels to accommodate 300 keys. Locked with institutional lever tumbler dead bolt. Supplied with 1 key.
 3. Factory prime for high performance coating and apply finish coats of paint in field

2.04 DETENTION FURNITURE

- A. Wall-Mounted Bunks:
 1. Overall Size: 76 inches long by 29 1/4 inches wide.
 2. Bottom Sheet: 10 gauge sheet steel; front and back edges flanged upward 2 1/8-inches and hemmed 1 1/8-inch.
 3. Wall Brackets: 3/16-inch steel sheet, formed to a triangular shaped gusset with 2 inch wall flange and lower edge.
 4. Construction: Entire assembly electric arc welded at such points and intervals to develop maximum strength with deep penetration and neat appearance. Spot welding will not be permitted.
 5. Provide manufacturers standard ladder fully welded to bunks.

6. Finish: Factory primed for field painting.
- B. Wall-Mounted Cell Desk:
1. Desk top: Formed from 11 gauge steel, flanges front and sides with up formed back splash at rear. Front edge shall be hemmed for safety.
 2. Seats: Minimum 12 inches diameter with 2 inch deep sides deep; formed from 16 gauge steel sheet; with minimum 1/2-inch angle stiffeners.
 3. Mast: Two schedule 40, 1 1/2-inch nominal dimension tubes with floor and table anchor/gusset plates.
 4. Removable Seat: Where accessible desks are indicated, provide one removable seat with locking pin as detailed.
 5. Finish: Factory primed for field painting.
- C. Wall Mounted Steel Benches:
1. Tops of wall mounted steel bench(es) shall be formed from one piece of 10 gauge steel sheet, flanged down 1-1/2 inch on all sides, with flange corners welded and neatly finished.
 2. Bench tops lengths shown on the drawings, and positioned on support brackets such that a minimum of 2 inch clearance is provided between rear of bench and wall.
 3. Bench support brackets shall be securely attached to tops, not more than 6 inch from each end, nor more than 36 inch apart. Brackets shall be formed from one piece of 3/16 inch steel, triangular shaped, not less than 10 inches high by 18 inches wide, with 1-1/2 inch flange at the wall mounting surface. Length as indicated on the drawings.
 4. Accessories: Special masonry embed back-up plate.
- D. Handcuff Bench: Floor mounted handcuff bench.
1. Materials: Steel plate and tube shapes is indicated on the drawing.
 2. Finish: Shop primed for field painting.
- E. Security Mirror:
1. Basis-of-Design Product: The design for mirrors is based on Model R565-411 as manufactured by Norix Group, Inc.
 - a. Other Acceptable Manufacturers:
 - 1) Southern Steel Detention Equipment; Model 432.
 2. Large One-Piece Mirror with Anchor Plate.
 3. Mirror shall be fabricated from minimum 18 gauge stainless steel polished for high reflectivity,
 4. Mirror anchor plates to be made of minimum 1/4-inch steel plate with holes to anchor plate.
 5. Anchor plates to have precast anchorage tabs applied to plate.
 6. Plates to be primed prior to shipment.
 7. Provide 1/4-20 tamperproof screws and special masonry embed back-up plate
- F. Collapsible Hooks:
1. Basis-of-Design Product: The design for collapsible hooks is based on Model S565-528 as manufactured by Norix Group, Inc.
 - a. Other Acceptable Manufacturers:
 - 1) Southern Steel Detention Equipment; Model 407.
 2. Hooks will be made of 14 gauge stainless steel.
 3. Hook body shall be welded to embed backer plate for mounting.
 4. Provide backer plate embed and tamper resistant screws.
- G. Floor Mounted Stool: 16 gauge, 300 series stainless steel approx. 12 inches in diameter, with flange welded to 2 3/8 inch stainless steel seat supports as detailed.

- H. Cell Toilet Paper Shelf: 10 gauge stainless steel with No. 3 finish. Fabricate as indicated on the drawings.
- I. Security Grab Bar:
 - 1. Available Manufacturers:
 - a. Chief Industries.
 - b. Jails Correctional Products.
 - c. Norix.
 - d. Southern Steel.
 - 2. Construction: 3 1/8 inch diameter 11 gauge type 304 stainless steel flanges heliarc welded to 1 1/2 inch outside diameter 18 gauge seamless tube.
 - 3. Length: 42 inches.
 - 4. Finish: Brushed stainless steel.
- J. Camera/Horn Guards: Steel bar guards as indicated on the drawings.
 - 1. Materials: 1/4 inch steel bar.
 - 2. Finish: Shop primed and painted.
- K. Food Pass: Southern Steel; Model 262 x 1017AT Food Pass (modified).
 - 1. Refer to drawing details for typical cell door food pass.
 - 2. Description:
 - a. Food Pass shall be edge mount configuration as indicated on the drawings.
 - b. Locks: Snaplatch with thumbturn.
 - c. Fram Material: 7 gauge mild steel.

2.05 DETENTION TABLES

- A. Available 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. American Jail Products, LLC.
 - 2. Bob Barker Company, Inc.
 - 3. Jails Correctional Products.
 - 4. Maximum Security Products Corp.
 - 5. Norix Group, Inc.
 - 6. Sweeper Metal Fabricators Corp.
- B. Tabletop: Formed from 0.140-inch thick, stainless-steel sheet; reinforced with steel shapes or steel plate, with minimum 1-1/2-inch flanged edges and checkerboard designed etched in top.
- C. Size: As shown on Drawings.
- D. Seats: 12-inch diameter, formed from 0.078-inch- thick, stainless-steel sheet; reinforced with 0.134-inch nominal-thickness steel plate, with minimum 1-1/2-inch flanged edges.
- E. Pedestal Supports: Formed from 4-inch-square by 0.134-inch- thick steel tubing welded to top and base plate.
- F. Seat Framing: Formed from 3-inch by 4 inch 0.134-inch- thick steel tubing welded to pedestal supports.
- G. Base Plate: Minimum 16-inch- square, 3/8-inch- thick steel plate punched with holes for floor anchorage.
- H. Capacity: Four persons.
- I. Finish:
 - 1. Steel Finish: Baked enamel or powder coat.
 - 2. Stainless-Steel Finish: No. 3.

2.06 DETENTION TABLE WITH TELEPHONE PEDESTAL

- A. Available 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. American Jail Products, LLC.
 - 2. Bob Barker Company, Inc.
 - 3. Jails Correctional Products.
 - 4. Maximum Security Products Corp.
 - 5. Norix Group, Inc.
 - 6. Sweeper Metal Fabricators Corp.
- B. Tabletop: Formed from 0.140-inch thick, stainless-steel sheet; reinforced with steel shapes or steel plate, with minimum 1-1/2-inch flanged edges and checkerboard designed etched in top.
- C. Size: As shown on Drawings.
- D. Seats: 12-inch diameter, formed from 0.078-inch- thick, stainless-steel sheet; reinforced with 0.134-inch nominal-thickness steel plate, with minimum 1-1/2-inch flanged edges.
- E. Pedestal Supports: Formed from 8-inch-square by 0.1875-inch- thick steel tubing welded to top and base plate.
- F. Seat Framing: Formed from 3-inch by 4 inch 0.18534-inch- thick steel tubing welded to pedestal supports.
- G. Base Plate: Minimum 16-inch- square, 3/8-inch- thick steel plate punched with holes for floor anchorage.
- H. Divider Partitions: 1/4 inch thick clear acrylic sheet.
- I. Capacity: Three persons.
- J. Finish:
 - 1. Steel Finish: Baked enamel or powder coat.
 - 2. Stainless-Steel Finish: No. 3.

2.07 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 furnishings 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 edges and corners to be free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a 1/2-inch- wide hem on the concealed side; ease edges of metal plate to a radius of approximately 1/32 inch.
 - 1. Fabricate detention furnishings 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 places 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 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. 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.
- G. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications 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 metal fabrications to receive hardware, security fasteners, and similar items.
- I. Form exposed work true to line and level with accurate angles and 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.

2.08 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish detention furnishings after assembly.

2.09 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."
- B. Factory Priming for Field-Painted Finish: Apply manufacturer's standard prime coat immediately after surface preparation and pretreatment.

2.10 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. 3 finish, unless otherwise indicated.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention furnishings.
1. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention furnishing connections before detention furnishing installation.
 2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of detention furnishings.

- B. Inspect built-in and cast-in anchor installations before installing detention furnishings 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 furnishings with those indicated on Coordination Drawings.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention furnishings 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 furnishings. Set detention furnishings 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. 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.
 - 5. Fillet Welds: Minimum size of 1/8 inch by 1-1/2 inches long, spaced not greater than 12 inches o. c.
- F. Adjust doors and latches of detention lockers and cabinets to operate easily without binding. Verify that integral locking devices operate properly.
- G. Assemble detention furniture that requires field assembly with security fasteners, with no exposed fasteners on exposed faces and frames.
- H. Anchor furnishings with security fasteners or by welding; 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.

3.03 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.

3.04 CLEANING AND PROTECTION

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 9600 - High Performance Coating.

END OF SECTION

**SECTION 13 4263
PRECAST CONCRETE DETENTION CELL MODULES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. This section includes the performance criteria, materials, equipment, related services, and supervision required for the manufacture and erection of the precast concrete detention cell modules and dorm modules
- B. This section includes plant-precast structural concrete cell units, including the following:
 - 1. Provide modular cells with non-insulated wall systems.
 - 2. Cell detention door embedded angles and other embeds shall be cast into cell modules - prime and finish painted. Prepared door frames templates and dimensions and embedded associated hardware shall be coordinated with the precast concrete cell manufacturer (PCCM), electronic security suppliers and door hardware suppliers.
 - 3. Embeds in concrete and connecting devices for precast concrete modular units.
 - 4. High Performance Coating interior walls, ceilings, and detention furniture.
 - 5. Floors of precast concrete modular cell units and balconies shall be unfinished.
 - 6. Wall mounted detention furniture - finish painted.
 - 7. Stainless steel mirrors.
 - 8. Security light fixture with bulbs.
 - 9. Embedded EMT conduit, wire, electrical boxes, devices, and security cover plates supplied by PCCM. Devices and cover plates for Inmate Intercom Station and MATV/DATA shall be provided and installed by the Electrical Contractor; conduits and junction boxes by cell manufacturer. Pull strings shall be installed in empty conduits.
 - 10. Cell light fixtures
 - 11. Provide embedded security supply and exhaust air grilles.
 - 12. Plumbing stainless steel combination units, stainless steel handicap combination units, flush valve, hot and cold valves, related trim and grab bars by PCCM. PCCM to install security wall sleeves as provided by the security plumbing fixture manufacturer.
 - 13. Security sealants - Security sealant at plumbing fixture by PCCM. PCCM shall seal all other areas requiring security and standard sealants.
 - 14. Tamperproof fasteners.
 - 15. Provide sleeves for sprinkler piping and sprinkler heads.

1.03 RELATED REQUIREMENTS

- A. Section 03 4100 - Precast Structural Concrete.
- B. Section 03 4113 - Precast Concrete Hollow Core Planks.
- C. Section 05 0527 - SECURITY METAL FASTENERS.
- D. Section 07 9200 - Joint Sealants.
- E. Section 08 3463 - DETENTION DOOR AND FRAMES.
- F. Section 08 7163 - Detention Door Hardware.
- G. Section 08 8853 - SECURITY GLAZING
- H. Section 09 9600 - High-Performance Coatings.
- I. Section 12 5500 - DETENTION FURNITURE.
- J. Section 21 0500 - Common Work Results for Fire Suppression.

- K. Section .22 4600 - SECURITY PLUMBING FIXTURES.
- L. Section 23 3700 - Air Outlets and Inlets.
- M. Section 28 1300 - Security Access Control System.

1.04 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.
- B. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

1.05 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide precast structural concrete units and connections, including connections to support framing and/or foundations, capable of withstanding design loads and erection forces within limits and under conditions indicated including, but not limited to, indicated building code and design criteria.
 - 1. Loads: As indicated on Structural Drawings.
 - 2. Design precast 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. Member deflections shall meet the limits of ACI 318.
 - 3. Thermal Movements: The precast system design shall consider the maximum seasonal climatic temperature change.
 - 4. Guardrail (superimposed) - 300 lbs. minimum, at any point on 54-inch high rail, or as governed by local code.
- B. Fire Resistance ratings: Provide precast concrete units to meet the fire ratings indicated on the Architectural Drawings.

1.06 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixes: Provide back-up test data conforming to ACI requirements for each concrete mix.
- C. Shop Drawings: Detail fabrication and installation of precast structural concrete cells. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, openings, connections, support conditions, and types of reinforcement, including special reinforcement.
 - 1. Indicate separate face and backup mix location.
 - 2. Indicate welded connections by AWS standard symbols and show size, length, and type of each weld. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints, including accessories.
 - 3. Indicate locations and details of anchorage devices to be embedded in other construction.
 - 4. Include and locate openings larger than by 10 inches.
 - 5. Indicate location of each precast structural concrete cell unit by same identification mark placed on panel.
 - 6. Indicate relationship of precast structural concrete cell units to adjacent materials.
 - 7. Indicate shim sizes and grouting sequence.
 - 8. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, notify the Architect/Engineer immediately and submit design calculations and drawings. Do not adversely affect the appearance, durability, or strength of unit when modifying details or materials. Maintain the general design concept when altering size of units and alignment.

9. Shop Drawings shall be prepared by or under the direct supervision of qualified Professional Engineer.
 10. Cut Sheet Submittal Book. Submittal Books shall contain all cut sheets for all fixtures, furniture, detention equipment, and concrete mix designs. Highlight all features and options included. Submit 4 copies of 3-ring binders with index sections and one electronic version.
 11. Show electrical layouts indicating location of all equipment and routing of conduit, and specified wire colors.
- D. Provide handling procedures, sequence of erection, and bracing plan.
- E. Design Calculations: Comprehensive engineering analysis signed and sealed by the qualified Professional Engineer responsible for its preparation, submitted for Owner's records. Include cover letter signed and sealed by responsible engineer indicating building code and design criteria used for analysis and stating that analysis was performed by or under his or her direct supervision.
1. Include calculated fire-resistance analysis.
- F. 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 12 by 12 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.
 - b. Grout Samples for Initial Selection: Color charts consisting of actual sections of grout showing manufacturer's full range of colors.
- G. Welding Certificates: Copies of certificates for welding procedures and personnel.
- H. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
1. Provide a current Certificate of Compliance, furnished by PCI, designating qualification listed in "Quality Assurance" for Installer and Fabricator.
- I. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Concrete materials.
 2. Reinforcing materials and prestressing tendons.
 3. Admixtures.
 4. Bearing pads.
 5. Structural steel shapes and hollow structural sections.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed precast structural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
1. Participates in PCI's Erector Qualification/Certification program and is designated a PCI-qualified erector for Category S2 (Complex Structural Systems) for load-bearing members.
 2. The PCCM shall provide a full-time Job Site Coordinator during all periods of precast erection.
- B. Fabricator Qualifications: A firm that complies with the following requirements and is experienced in manufacturing precast structural concrete units similar to those indicated for this Project and with a record of successful in-service performance.

1. Assumes responsibility for designing precast concrete structural units and connections to comply with performance requirements. This responsibility includes preparation of Shop Drawings and design calculations by a qualified professional engineer.
 2. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group C, Category C3A or is NPCA (National Precast Concrete Association) certified.
 3. Has a minimum of ten years experience in design and production of precast concrete pre-finished modular cells.
 4. Has a minimum of three completed projects of equal or greater size and magnitude as this project within 400 miles of the site.
 5. Has completed five similar projects within the past two calendar years.
 6. Has sufficient production capacity to produce required units without delaying the Work.
 7. Must arrange for and provide all travel expenses for the Owner and the A/E to visit completed pre-finished precast cell for review prior to submitting shop drawings.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for precast structural concrete units and connections that are similar to those indicated for this Project in material, design, and extent.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.
- E. Design Standards: Comply with ACI 318 and the design recommendations of PCI MNL-120, "PCI Design Handbook--Precast and Prestressed Concrete."
- F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and camber and dimensional tolerances for types of units required, comply with PCI MNL-116, "Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products."
1. Comply with camber and dimensional tolerances of PCI MNL-135, "Tolerance Manual for Precast and Prestressed Concrete Construction."
- G. Product Options: Drawings indicate size, profiles, and dimensional requirements of precast concrete cells and are based on the specific types of units indicated. Other fabricators' precast concrete cells complying with requirements may be considered. Refer to Division 01.
- H. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel"; and AWS D1.4/D1.4M, "Structural Welding Code--Reinforcing Steel." All welding shall be performed by certified welders only.
- I. Calculated Fire Resistance: Where indicated, provide precast structural concrete cells whose fire resistance has been calculated according to PCI MNL-124, "Design for Fire Resistance of Precast Prestressed Concrete," and is acceptable to authorities having jurisdiction.
- J. Fire-Test-Response Characteristics: Provide precast structural concrete cells that comply with the following requirements:
1. Fire rating requirements as indicated on Code Summary Drawing.
 2. Fire-response testing was performed by UL, or another testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
 3. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," or from the listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E119.
 4. Products are identified with appropriate markings of applicable testing and inspecting agency.

- K. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.08 MOCK-UP UNITS

- A. Precast Concrete Cell Mock-Up: Fabricate at the plant, outfit, and finish one each of the following:
1. Floor level - typical double cell plan with one accessible cell
 2. Mezzanine level - typical double cell plan with integral balcony and chase floor.
- B. Mockups shall include all items indicated on Drawings and in this Specification that are to be included as part of the finished cell.
- C. The purpose of the mockup is to identify quality assurance expectations of the final product with regards to finish and aesthetics, not the placement of fixtures. Placement of fixtures and overall cell geometry will not be the subject of adjustment. Upon completion, all parties concerned will inspect the mock-up at the plant. When approved in writing by the project Architect and Engineer the mock-up will be used to establish the standard of quality and performance by which the work will be judged. Do not fabricate remaining units until after written approval of the mock-up by the project Architect and Engineer (any other signatures are invalid).
1. The project Architect and Engineer will review and approve the mock-up at the manufacturing facility.
 2. The manufacturer shall provide round-trip transportation and accommodations for overnight stay (as required) for Six (6) representatives of the owner to view the mockup. The manufacturer shall coordinate the time of the mock-up viewing to accommodate the Owners' schedule.
 3. The manufacturer shall provide a second round-trip transportation and accommodations for overnight stay (as required) for six (6) representatives of the owner, at a time agreed upon by the owner and manufacturer, to view a representative set of cells during production as a quality control check.
 4. After written approval, of the mockup by the project Architect and Engineer, the remaining units may be fabricated. The subcontractor will allow the Architect and Engineer to inspect the fabricated units at any time at the plant.
 5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 6. The approved standard cell mock-up's shall be installed as the first cells on site and maintained to be uses as a quality reference standard for the job.
- D. PCCM shall clean mock-up. Trades, under a separate contract, and after cell placement will install and complete service connections at PCCM chase terminations.
- E. Adjust shop drawings as necessary to incorporate all adjustments for a final review prior to proceeding with cell production.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver precast structural concrete units to Project site in such quantities and at such times to ensure continuity of installation.
- B. Support units during shipment on nonstaining shock-absorbing material in same position as during storage.
- C. 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.
- D. 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.
- E. Lift and support units only at designated lifting and supporting points as shown on Shop Drawings.

1.10 SEQUENCING

- A. Furnish loose connections and anchorage items to be embedded in other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 PRODUCTS

2.01 GENERAL

- A. Provide modular precast cells consisting of a monolithically cast five-sided module or six-sided module including ceilings and walls and floors. Coordinate installation of windows, doors, and frames, furnishings, electrical and plumbing and fire protection wall sleeves, fixtures and other items as specified in this section. Exterior wall shall have a thermal resistance of R-15.

2.02 FABRICATORS

- A. Fabricators: The design for precast concrete detention cell modules is based on modules fabricated by Oldcastle Infrastructure, 200 Keystone Drive, Telford, PA 18969; Telephone 215-257-8081. Subject to compliance with requirements, provide the specified products or products from one of the following:
 1. Tindall Corporation, Conley, GA; Telephone: 800-849-6383.
 2. RW Modular Solutions, LLC, 16 Wright Avenue, Spring City, PA 19475; Telephone: 215-776-1071.
 3. Pennstress, 8180 Woodbury Pike, Roaring Spring, PA 16673; Telephone: 814-693-5418.

2.03 MOLD MATERIALS

- A. Molds: Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is nonreactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for 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 treatments of precast concrete.
- B. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

2.04 REINFORCING MATERIALS

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A615/A615M ASTM A706/A706M deformed.
- D. Galvanized Reinforcing Bars: ASTM A767/A767M, Class II zinc coated, hot-dip galvanized after fabrication and bending, as follows:
 1. Steel Reinforcement: ASTM A615/A615M, Grade 60 or ASTM A706/A706M, deformed.
- E. Steel Bar Mats: ASTM A184/A184M, assembled with clips, as follows:
 1. Steel Reinforcement: ASTM A615/A615M, Grade 60 or ASTM A706/A706M, deformed bars.

- F. Plain-Steel Wire: ASTM A820/A820M.
- G. Deformed-Steel Wire: ASTM A496/A496M.
- H. Plain-Steel Welded Wire Fabric: ASTM A185/185M, fabricated from steel wire into flat sheets.
- I. Deformed-Steel Welded Wire Fabric: ASTM A497/A497M, flat sheet.
- J. Supports: Manufacturer's bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place according to CRSI's "Manual of Standard Practice," PCI MNL-116, and as follows:
 - 1. For uncoated reinforcement, use all-plastic, CRSI Class 1 plastic-protected, or CRSI Class 2 stainless-steel bar supports.
 - 2. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire or all-plastic bar supports.

2.05 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type III, of same type, brand, and source.
 - 1. For surfaces exposed to view in finished structure, use gray and white, same type brand, and mill source throughout the precast concrete production.
 - 2. Standard gray Portland cement may be used for non-exposed backup concrete.
- B. Supplementary Cementitious Materials:
 - 1. Fly Ash: ASTM C618, Class C or F.
 - 2. Metakaolin Admixture: ASTM C618, Class N.
 - 3. Silica Fume Admixture: ASTM C1240.
 - 4. Ground Granulated Blast-Furnace Slag: ASTM C989/C989M, Grade 100 or 120.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL-116, ASTM C33/C33M, with coarse aggregates complying with Class 4S. Provide and stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
 - 1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
 - a. Gradation: To match design reference sample.
 - 2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand of same material as coarse aggregate unless otherwise approved by Architect.
 - 3. Nominal Maximum Aggregate Size: 3/4-inch.
 - 4. Backup Concrete Aggregates: ASTM C33/C33M or ASTM C330/C330M.
- D. Lightweight Aggregates: Except as modified by PCI MNL-116, ASTM C330/C330M with absorption less than 11 percent.
- E. Coloring Admixture: ASTM C979/C979M, 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 C260/C260M, certified by manufacturer to be compatible with other required admixtures.
- H. Chemical Admixtures: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M and PCI MNL-116, 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 Admixture: ASTM C1017/C1017M.

2.06 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A36/A36M.
- B. Carbon-Steel Headed Studs: ASTM A108, AISI 1018 through AISI 1020, cold finished; AWS D1.1/D1.1M, Type B, with arc shields.
- C. Carbon-Steel Plate: ASTM A283/A283M.
- D. Malleable Steel Castings: ASTM A47/A47M.
- E. Carbon-Steel Castings: ASTM A27/A27M, Grade 60-30.
- F. High-Strength, Low-Alloy Structural Steel: ASTM A572/A572M.
- G. Carbon-Steel Structural Tubing: ASTM A500/A500M, Grade B.
- H. Wrought Carbon-Steel Bars: ASTM A675/A675M, Grade 65.
- I. Deformed-Steel Wire or Bar Anchors: ASTM A496/A496M or ASTM A706/A706M.
- J. Carbon-Steel Bolts and Studs: ASTM A307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A563; and flat, unhardened steel washers, ASTM F844.
- K. High-Strength Bolts and Nuts: ASTM A325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A563; and hardened carbon-steel washers ASTM F436/F436M.
- 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 A123/A123M, after fabrication, and ASTM A153/A153M, as applicable typical except provide electrode position according to ASTM B633, SC 3 for threaded fasteners.
 1. 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-21035A 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 FS TT-P-664 according to SSPC-PA 1.
- N. Reglets: Stainless steel, Type 302 or 304 felt or fiber filled.
- O. Welding Electrodes: Comply with AWS standards.
- P. Accessories: Provide clips, hangers, plastic shims, and other accessories required to install precast structural concrete units.

2.07 BEARING PADS

- A. Provide bearing pads for precast structural concrete units as recommended by the precast fabricator for application:
 1. Elastomeric Pads: AASHTO M251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore A durometer according to ASTM D2240, minimum tensile strength 2250 psi per ASTM D412.
 2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer. . Capable of supporting a compressive stress of 3000 psi with no cracking, splitting or delaminating in the internal portions of the pad. Test one specimen for each 200 pads used in the Project.
 3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer. .

Conforming to Division II, Section 18.10.2 of AASHTO Standard Specifications for Highway Bridges, or Military Specification, MIL-C-882E.

4. Frictionless Pads: PolyTetrafluoroethylene (PTFE), glass-fiber reinforced, bonded to mild-steel plate, of type required for in-service stress.
5. Hardboard: AHA A135.4, Class 1, tempered hardboard strips, smooth on both sides.
6. High-Density Plastic: Multimonomer, nonleaching, plastic strip capable of supporting construction loads with no visible overall expansion.

2.08 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C150/C150M, Type I, and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M, of consistency suitable for application.
- C. Epoxy Grout: ASTM C881/C881M, 2-component epoxy resin, of type, grade, and class to suit requirements.

2.09 CONCRETE MIXES

- A. Prepare design mixes for each type of 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, granulated blast-furnace slag to 40 percent of portland cement by weight, and metakaolin and silica fume to 10 percent of portland cement by weight.
- B. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.
- C. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318 or PCI MNL-116 when tested according to ASTM C1218/C1218M.
- D. Normal-Weight Concrete: Proportion mixes 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 minimum.
 2. Maximum Water-Cementitious Materials Ratio: 0.40.
 3. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content complying with PCI MNL-116.
- E. Lightweight Concrete: Proportion mixes 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 minimum.
 2. Unit Weight: Calculated equilibrium unit weight of 115 lb/cu. ft., plus or minus 3 lb/cu. ft., according to ASTM C567/C567M.
 3. Add air-entraining admixture at manufacturer's prescribed rate to result in lightweight concrete at point of placement having an air content complying with PCI MNL-116 and ASTM C494/C494M.
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL-116.

- G. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures according to manufacturer's written instructions.
- H. 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 COMPONENTS

- A. Provide the following items as shown on drawings and specified:
 - 1. Bunks per Section 12 5500.
 - 2. Mirror per Section 12 5500.
 - 3. Desk with seats per Section 12 5500.
 - 4. Grab bars per Section 12 5500.
 - 5. Detention door and frame per Division 08 Section "Detention Doors and Frames.
 - 6. HVAC air outlets and inlets per Section 23 3700.
 - 7. Light Fixtures per Division 26 Sections.
 - 8. Junction Box for Lock per Divisions 26, 27 and 28 Sections.
 - 9. Junction Box for Cell Light per Divisions 26, 27 and 28 Sections.
 - 10. Junction Box for Intercom/Call Button per Divisions 26, 27 and 28 Sections.
 - 11. Receptacles, Conduit and Wiring per Division 26.
 - 12. Sprinkler wall sleeve per Division 21 Sections.
 - 13. Joint sealants per Section 07 9200.
 - 14. Coating systems per Section 09 9600.
 - 15. Plumbing fixtures per Section 22 4600.

2.11 FABRICATION

- A. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances.
 - 1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's written instructions.
 - 2. Form joints are not permitted on faces exposed to view in the finished work.
 - 3. Edge and Corner Treatment: Uniformly chamfered or as built in on standard forms.
- B. 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. Do not relocate bearing plates in units unless approved by Architect.
 - 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."
- C. 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.
- D. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.
 - 1. Coordinate with other trades for installation of cast-in items.

- E. Cast-in openings larger than 10 inches in diameter or 10 inches square according to Shop Drawings. Smaller holes may be field cut by trades requiring them, as approved by Architect and precast manufacturer.
 - 1. Provide headers of cast-in-place concrete or structural steel shapes as required.
- F. Reinforcement: Comply with recommendations in PCI MNL-116 and CRSI's "Manual of Standard Practice" 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.
 - 2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete-placement operations and consolidation operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required. Completely conceal support devices to prevent exposure on finished surfaces.
 - 3. Place reinforcement to obtain at least the minimum coverage for concrete protection according to ACI 318. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
 - 4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. 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.
 - 1. Use only face mix for those units in which more than one major face (edge) is exposed.
 - 2. Where only one face of unit is exposed and at the fabricator's option either of the following mix design/casting techniques may be used:
 - a. A single design mix throughout the entire thickness of panel.
 - b. Design mixes for facing and backup; using cement and aggregate specified for facing mix. Use cement and aggregate for backup mix complying with criteria specified or as selected by the fabricator.
- 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, "Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete."
- L. Comply with ACI 306.1 procedures for cold-weather concrete placement.
- M. Comply with ACI 306R recommendations for hot-weather concrete placement.
- N. Identify pickup points of precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint casting date on each precast 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.

2.12 FABRICATION TOLERANCES

- A. Product Tolerances: 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 tolerances as well as position tolerances for cast-in items.
 - 1. 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.
- B. Precast Concrete Detention Cell Modules:
 - 1. Comply with the following tolerances for manufacture of precast cells:
 - a. Length, single or double cell +/- 1/4-inch.
 - b. Width, single cell +/- 1/8-inch.
 - c. Width, double cell +/- 1/4-inch.
 - d. Height, +/- 1/4-inch.
 - e. Balcony width, single or double cell +/- 1/4-inch.
 - f. Wall thickness, + 1/4-inch, 0 in.
 - g. Plate recess, +1/4 in., -1/8-inch.
 - h. Tipping of plates, +/- 1/8-inch.
 - i. Position of plates +/- 1/2-inch.
 - j. Position of electrical boxes +/- 1 inch.
 - k. Out of square of electrical boxes +/- 1/8-inch.
 - l. Vertical cell plumbness, +/- 1/8-inch.
 - m. Floor thickness, +/- 1/4-inch.
 - n. Local smoothness, 1/8-inch per 10 feet any surface.
 - o. Squareness top and bottom, +/- 1/8-inch.
 - p. Concrete cover on reinforcing, +/- 1/4-inch.
 - 2. Walls of precast concrete modular cell units will be allowed 1/8" per 1' tolerance in vertical direction.

2.13 FINISHES

- A. General: Component surfaces shall be formed as shown on the approved shop drawings. Bearing surfaces of all components shall be square, true, and free from honeycombing.
- B. Smooth finish: Provide smooth surface finish free of form marks, pockets, sand streaks, and honeycomb, with uniform color and texture.
- C. Interior face of units shall have a steel form finish as obtained with a well-designed mix and proper vibration. Small air pockets (1/8-inch maximum), and same-sized pits will be acceptable. Chips and spalls that occur during transportation and erection shall be patched satisfactorily as far as conformity to original shape, texture, and structural adequacy.
- D. Exterior face of modular units will be allowed to have small air pockets and pits. Chips and spalls that occur during transportation and erection shall be patched satisfactorily as far as conformity to original shape, texture, and structural adequacy. The exterior finish shall be as follows:
 - 1. Faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of precast concrete units to match approved mockup and as follows:
 - a. Fabricators offering products with insulated exterior walls are required to match the finishes specified in Precast Structural Concrete for the finished surfaces of exterior walls. Refer to Section 03 4100.
- E. Unacceptable Finish Conditions: Except as specifically approved or inherent in the design of the modular units, the following is partial list of finished defects and/or problems which will cause rejection for installation in this project and must be corrected in manufacturing or

designing procedures:

1. Ragged or irregular edges.
2. Excessive air pits and voids evident on exposed surface.
3. Adjacent flat and return surfaces with more than slight difference in exposure.
4. Casting lines evident from different placements.
5. Visible form joints or irregular surfaces greater than 1/16-inch.
6. Rust staining on surfaces.
7. Reinforcing shadow lines.

2.14 FINISH SURFACES PREPARATION AND PAINTING

- A. Examination:
 1. Verify that surfaces, substrate conditions are ready to receive work, as instructed by the product manufacturer.
 2. Test shop applied primer for compatibility with subsequent cover materials.
 3. Discrepancies:
 - a. In the event of a discrepancy, immediately notify the Architect.
 - b. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- B. Preparation: Comply with this specification and the high performance coating specification whichever is more stringent.
 1. Protective Measures: Prior to surface preparation procedures, the following protective measures shall be taken:
 2. Windows - place protective boards over all windows.
 3. Inserts - place protective closures over all inserts.
 4. HVAC - place protective boards or duct tape over all HVAC grilles.
 5. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
 6. Form marks need to be ground smooth and filled so as to provide a uniform flat surface on the interior of the cell.
 7. Concrete surfaces to be coated shall be lightly abrasive blasted to remove laitance, curing compounds, form release agents, and other contamination and to expose surface air pockets (voids). Care shall be taken not to over blast in order to prevent damage to the concrete. The air pressure should be set around 60 psi and gradually increased, if necessary, to achieve the desired results.
 - a. Fill air pockets and pits with epoxy patching material acceptable to high performance coating manufacturer.
 8. Protect doors and frames from deterioration or damage on site.
- C. Application: Apply products in accordance with paint manufacturer's instructions and this specification whichever is more stringent.
- D. Refer to Section 09 9600 for paint systems.

2.15 SOURCE QUALITY CONTROL

- A. Maintain plant records and quality control program during production of precast members. Make records available upon request.
- B. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL-116 requirements.
 1. Test and inspect self-consolidating concrete according to PCI TR-6, "Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete."
- C. Strength of precast concrete units will be considered deficient if units fail to comply with PCI MNL-116 requirements, including the following:

1. Units fail to comply with compressive-strength test requirements.
 2. Reinforcement and prestressed tendons of units do not comply with fabrication requirements.
 3. Concrete curing and protection of units against extremes in temperature fail to comply with requirements.
 4. Units are damaged during handling and erecting.
- D. Testing: If there is evidence that the strength of precast concrete units may be deficient or may not comply with PCI MNL-116 requirements, Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C42/C42M.
1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect and precast manufacturer.
 2. Cores will be tested in an air-dry condition per ACI 301 if units will be dry under service conditions.
 3. Strength of concrete for each series of 3 cores will be considered satisfactory if the average compressive strength is equal to at least 85 percent of the 28-day design compressive strength and no single core is less than 75 percent of the 28-day design compressive strength.
 4. Test results will be made in writing on the 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 or units represented by core tests; design compressive strength; type of break; compressive strength at break, 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 concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
- F. Dimensional Tolerances: Units with dimensions smaller or larger than required and not complying with tolerance limits may be subject to additional testing.
1. Precast concrete units with dimensions larger than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to comply with construction conditions.
- G. Defective Work: Precast concrete units that do not comply with requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ensure that all lifting devices, used for placement of cell modules are as supplied by the manufacturer or approved by the Precast Concrete Contractor's job site coordinator.

3.02 INSTALLATION

- A. Install loose 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. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
 - 2. 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.
 - 3. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
 - 4. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
- 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.
- 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 unless approved by Architect and precast manufacturer.
- F. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
 - 1. Protect precast concrete structural 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 A780/A780M.
 - 3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
 - 4. Visually inspect all welds critical to precast connections. 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. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
 - 5. Keep grouted joints damp for not less than 24 hours after initial set.
- I. Erection Tolerances: Install precast concrete units level, plumb, square, and true, without exceeding the recommended erection tolerances in PCI MNL-135, "Tolerance Manual for Precast and Prestressed Concrete Construction."

1. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.
 2. Plan location from building grid datum: +/- 1/4-inch.
 3. Support elevation from nominal elevation.
 4. Maximum low: 1/2-inch.
 5. Maximum high: 1/4-inch.
 6. Plumb in any 10 foot of element height: 1/4-inch.
 7. Maximum jog in alignment of matching edges: 1/4-inch.
 8. Joint width (governs over joint taper) +/- 1/4-inch.
 9. Joint taper maximum 3/8-inch.
 10. Joint taper over 10-foot length 1/4-inch.
- J. Coordinate the connection of building utilities to cells in the chases. Remain at the site until all cells function for their intended purpose.

3.03 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform testing and inspection items as defined in Section 01 4533 - Code-Required Special Inspections and Procedures. Contractor is required to cooperate with the Independent Agency for the tests and inspections listed in Section 01 4533 - Code-Required Special Inspections and Procedures and not for completing those requirements.

3.04 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.
 2. The Architect reserves the right to reject repaired units that do not comply with requirements.
- 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.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780/A780M.
- 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.

3.05 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 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.

3.06 PROTECTION

- A. Once erected, the securing/protection of precast modular cells and all contained equipment become the responsibility of the GC.

END OF SECTION

**SECTION 14 2100
ELECTRIC TRACTION ELEVATORS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to requirements of this Section.

1.02 SECTION INCLUDES

- A. Complete electric traction elevator systems.
 - 1. Passenger type.
- B. Elevator Maintenance Contract.

1.03 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Includes elevator pit and grouting thresholds.
- B. Section 03 3000 - Cast-in-Place Concrete: Execution requirements for placement of special guide rail brackets and inserts for casting in concrete.
- C. Section 04 2000 - Unit Masonry: Masonry hoistway enclosure; building-in and grouting hoistway door frames.
- D. Section 05 1200 - Structural Steel Framing: Includes divider beams and overhead hoist beams.
- E. Section 05 5000 - Metal Fabrications: Includes elevator pit ladder and sill supports.
- F. Section 07 8400 - Firestopping: Fire rated sealant in hoistway.
- G. Section 09 6500 - Resilient Flooring: Floor finish in car.
- H. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in hoistway.
- I. Section 22 0513 - Common Motor Requirements for Plumbing Equipment: Motor for sump pump in pit.
- J. Section 22 3000 - Plumbing Equipment: Pit sump and pump.
- K. Section 26 0533.13 - Conduit for Electrical Systems:
- L. Section 26 0583 - Wiring Connections:
 - 1. Electrical characteristics and wiring connections.
 - 2. Electrical service to main disconnect located in hoistway.
 - 3. Emergency power transfer cabinet.
 - 4. Electrical power for elevator installation and testing.
 - 5. Electrical disconnecting device to elevator equipment prior to activation of sprinkler system.
 - 6. Electrical service for convenience outlets and elevator pit.
 - 7. Lighting in elevator pit.
 - 8. Conduit for telephone service to location(s) as indicated on drawings.
- M. Section 26 3600 - Transfer Switches: For interface with elevator controls.
- N. Section 28 2000 - Video Surveillance System: Installation of video camera in car interior for security monitoring.
- O. Section 28 3116 - Addressable Fire Alarm System:
 - 1. Fire and smoke detectors and interconnecting devices.
 - 2. Fire alarm signal lines to elevator controller cabinet.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. AISC 360 - Specification for Structural Steel Buildings.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- D. ASME A17.1 - Safety Code for Elevators and Escalators.
- E. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- G. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.
- H. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- I. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- K. ITS (DIR) - Directory of Listed Products.
- L. NFPA 13 - Standard for the Installation of Sprinkler Systems.
- M. NFPA 70 - National Electrical Code.
- N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
- O. UL (DIR) - Online Certifications Directory.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other installers to provide necessary conduits for proper installation of wiring, including but not limited to, the following:
 - a. Elevator pit for lighting and sump pump.
 - b. Automatic transfer switch from controller cabinet.
 - c. Fire alarm panel from controller cabinet.
 - 2. Coordinate work with other installers for equipment provisions necessary for proper elevator operation, including but not limited to, the following:
 - a. Automatic transfer switches with auxiliary contacts for emergency power transfer status indication.
 - b. Shunt trip devices for automatic disconnection of elevator power prior to fire suppression system activation; include provisions for shunt trip power monitoring.
 - c. Overcurrent protection devices selected to achieve required selective coordination.
- B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
 - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.
 - 2. Review use of elevator for construction purposes, hours of use, scheduling of use, cleanliness of car, employment of operator, and maintenance of system.
- C. Construction Use of Elevator: Provide designated elevator for transport of construction personnel and materials in compliance with ASME A17.1.
 - 1. Make elevator available for construction use as early as possible.
 - 2. Enclose car with protective plywood on floor, walls, and ceiling.
 - 3. Provide temporary lighting.
 - 4. Provide control panel with manual operation.

1.06 SUBMITTALS

- A. Product Data: Submit data on following items:
 - 1. Signal and operating fixtures, operating panels, and indicators.
 - 2. Car design, dimensions, layout, and components.
 - 3. Car and hoistway door and frame details.
 - 4. Electrical characteristics and connection requirements.
- B. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
 - 1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
 - 2. Hoistway Components: Size and location of car machine beams, guide rails, buffers, ropes, and other components.
 - 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
 - 4. Individual weight of principal components; load reaction at points of support.
 - 5. Loads on hoisting beams.
 - 6. Clearances and over-travel of car and counterweight.
 - 7. Locations in hoistway of traveling cables and connections for car lighting and telephone.
 - 8. Location and sizes of hoistway and car doors and frames.
 - 9. Calculated heat dissipation of elevator equipment shaft.
 - 10. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
 - 11. Interface with building security system.
 - 12. Electrical characteristics and connection requirements.
 - 13. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.
- C. Samples: Submit samples illustrating car floor material, car interior finishes, car and hoistway door and frame finishes, and handrail material and finish in the form of cut sheets or finish color selection brochures.
- D. Designer's Qualification Statement.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H. Initial Maintenance Contract.
- I. Maintenance Contract: Submit proposal to Owner for standard one year continuing maintenance contract agreement in accordance with ASME A17.1 and requirements as indicated, starting on date initial maintenance contract is scheduled to expire.
 - 1. Indicate in proposal the services, obligations, conditions, and terms for agreement period and for renewal options.

1.07 QUALITY ASSURANCE

- A. Maintain one copy of each quality standard document on site.
- B. Designer Qualifications: Design guide rails under direct supervision of a licensed Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum fifteen years documented experience.

- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least fifteen years of documented experience and approved by elevator manufacturer.
- E. Products Requiring Fire Resistance Rating: Listed and classified by ITS (DIR) or UL (DIR).
- F. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose indicated in construction documents.

1.08 WARRANTY

- A. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design - Electric Traction Elevators: ThyssenKrupp Elevator; Evolution 200 Self-Supported Machine Room-Less Elevator; www.thyssenkruppelevator.com/#sl.
- B. Other Acceptable Manufacturers - Electric Traction Elevators:
 - 1. Otis Elevator Company; GEN2 Elevator System: www.otis.com/#sle.
 - 2. Schindler Elevator Corporation; Schindler 3300 Low-Rise MRL: www.us.schindler.com/#sle.
- C. Substitutions: See Section 01 6000 - Product Requirements.
 - 1. For any product not identified as Basis of Design, submit information as specified for substitutions.

2.02 ELECTRIC TRACTION ELEVATORS

- A. Electric Traction Passenger Elevator, Numbers 1 and 2:
 - 1. Electric Traction Elevator Equipment:
 - a. Machine: The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of PMAC motor, brake and driving sheave mounted on a rigid bedplate in the top of the hoistway. A large solid, forged shaft shall serve as a support for the motor rotor assembly and for the drive sheave and brake system. It shall be supported by roller bearings mounted in the machine housing..
 - 2. Drive System:
 - a. Synchronous alternating current (AC) motors and variable voltage variable frequency (VVVF) drive.
 - 3. Operation Control Type:
 - a. Two-Car Selective Collective Automatic (Duplex Collective Automatic) Operation Control.
 - 4. Service Control Type:
 - a. Standard service control only.
 - 5. Interior Car Height: 93 inch.
 - 6. Electrical Power: 480 volts; alternating current (AC); three phase; 60 Hz.
 - 7. Rated Net Capacity: 3500 pounds.
 - 8. Rated Speed: 200 feet per minute.
 - 9. Hoistway Size: As indicated on drawings.
 - 10. Interior Car Platform Size: 80 inch wide by 65 1/2 inch deep.
 - 11. Elevator Pit Depth: 60 inch.
 - 12. Overhead Clearance at Top Floor: 144 inch.
 - 13. Travel Distance: As indicated on drawings.
 - 14. Number of Stops: As indicated on drawings.
 - 15. Number of Openings: 2 Front; 3 Rear.

16. Traction Machine Location: Top of hoistway shaft.

2.03 COMPONENTS

- A. Elevator Equipment:
 - 1. Motors, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Comply with NFPA 70 requirements, and refer to Section 26 0583 for additional requirements.
 - 2. Guide Rails, Cables, Counterweights, Sheaves, Buffers, Attachment Brackets and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.
 - 3. Buffers:
 - a. Spring type for elevators with speed less than or equal to 200 feet per minute.
 - 4. Lubrication Equipment:
 - a. Provide grease fittings for periodic lubrication of bearings.
 - b. Grease Cups: Automatic feed type.
 - c. Lubrication Points: Visible and easily accessible.
- B. Electrical Equipment:
 - 1. Motors: PMAC, totally enclosed, non-ventilated with class "F" insulation.
 - 2. Boxes, Conduit, Wiring, and Devices: Complying with NFPA 70 and in accordance with Sections 26 0533.13 and 26 0583.
 - 3. Sump Pump in Pit: Refer to Section 22 3000.
 - 4. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.
 - 5. Include wiring and connections to elevator devices remote from hoistway. Refer to Section 26 0583.

2.04 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.
- D. Comply with seismic design requirements in accordance with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
 - 1. Comply with Elevator Safety Requirements for Seismic Risk Zone in accordance with ASME A17.1, ASCE 7 and other related requirements.
 - a. Project Seismic Risk: As indicated on drawings.
 - 2. Provide earthquake emergency operations in accordance with ASME A17.1 requirements.
 - 3. Provide seismic switch in accordance with ASME A17.1 and ASCE 7 requirements.
- E. Perform welding of steel in accordance with AWS D1.1/D1.1M.
- F. Fabricate and install door and frame assemblies in accordance with NFPA 80 and complying with requirements of authorities having jurisdiction (AHJ).
- G. Perform electrical work in accordance with NFPA 70.
- H. Comply with venting or pressurization of hoistway design in accordance with HVAC system requirements and authorities having jurisdiction (AHJ).
- I. Comply with fire protection sprinkler system of hoistway design in accordance with NFPA 13 requirements and authorities having jurisdiction (AHJ). Refer to Section 21 1300.

2.05 OPERATION CONTROLS

- A. Elevator Controls: Provide landing operating panels and landing indicator panels.

1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
 2. Landing Indicator Panels: Illuminating.
 3. Comply with ADA Standards for elevator controls.
- B. Interconnect elevator control system with building security, fire alarm, card access, smoke alarm, and building management control systems.
- C. Door Operation Controls:
1. Program door control to open doors automatically when car arrives at floor landing.
 2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
 3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.
- D. Lobby Monitoring Panel:
1. Locate status indicator and control panel for each individual elevator and group of elevators as indicated on drawings.
 2. Mount panel in console as indicated on drawings.
 3. Coordinate size and style of panel with console manufacturer.
 4. Etch face plate markings in panel, and fill with paint of contrasting color.
 5. Include direction indicator displaying landing "Up" and "Down" calls registered at each landing floor.
 6. Include position and motion display for direction of travel of each elevator; display appropriate graphic characters on non-glare screen; indicate position of cars at rest and in motion.
 7. Include a "Remove From In Service" switch for each elevator that then calls car to ground floor and parks car with doors open.
 8. Include emergency power selector switch for each group of elevators that overrides automatic emergency power selection.
 9. Include "Firefighter's Service Switch" that manually recalls each elevator to main floor.
- E. Provide "Firefighter's Emergency Operation" in accordance with ASME A17.1, applicable building codes, and authorities having jurisdiction (AHJ).
1. Designated Landing: Level 03.

2.06 OPERATION CONTROL TYPE

- A. Controller: The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and work load. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
 2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.

3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.
 4. A car that is stopping for the last hall call in the preference direction, and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed allowing time for a passenger to register an onward car call which shall maintain the preference. If no car call is registered before the door is almost closed, the car shall lose its preference and shall be available to accept calls in either direction.
- B. Operation: Selective Collective – ETA based. The system is optimized to get a car to the floor where a hall call has been registered, in the shortest time. The system receives input information from standard call pushbuttons located in the hall, car position and car load information from individual car loadweighers.
1. When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel. When a car's status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.
 2. Traffic Pattern: The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.
 3. Artificial Intelligence: Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence shall optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.
- C. Load Weighing Device: Provide a load weighing device on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass landing calls but not car calls. The passed landing calls shall remain registered for the next following car.
1. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50 pound (23 Kg.) load change under all conditions.
 2. The load sensor shall use a load cell to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.
- D. Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.
- E. Position Selector: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.
- F. Motion Control: The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system

producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

- G. Motor Pre-Torque: Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.
- H. Emergency Power Operation: (Group 10-D4A) Upon loss of normal power, building-supplied standby power is available to the elevator on the same wires as the normal power. Once the loss of normal power has been detected and standby power is available, one elevator at a time from each group will be lowered to a pre-designated landing and will open the doors. After passengers have exited the elevator, the doors are closed and the car shuts down. The next available car in the group will then be selected to lower, allow passengers to exit, close the doors and shutdown. This process is repeated until all cars in the group have been lowered and parked. At this time, an elevator is automatically allowed to continue service using the building-supplied standby power. A manual selection switch is available to override the automatic selection and allow a car in the group to provide service to the building. When normal power is restored, the elevators automatically resume operation.
- I. Destination Dispatch: Not Applicable
- J. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.
- K. Special Operation: Limited Access Operation: A key switch shall be provided to initiate the Limited Access Operation. The activation of this operation shall restrict the operation of the elevator car calls to selected floors on a per-floor, per elevator basis. Travel to the restricted floors shall be allowed after the entry of the required access code via a card reader device supplied by others. The card reader entry shall override the car call restrictions and allow entry of a car call to a restricted floor.

2.07 EMERGENCY POWER

- A. Set-up elevator operation to run with building emergency power supply when the normal building power supply fails, and in compliance with ASME A17.1 requirements.
- B. Building Emergency Power Supply: Supplied by backup generator; provide elevator system components as required for emergency power characteristics with phase rotation the same as for normal power.
 - 1. Provide transfer switches and auxiliary contacts.
 - 2. Install connections to power feeders.
- C. Emergency Lighting: Comply with ASME A17.1 elevator lighting requirements.
- D. Provide operational control circuitry for adapting the change from normal to emergency power.
- E. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.
- F. Upon loss of normal power, building-supplied standby power is available to the elevator on the same wires as the normal power. Once the loss of normal power has been detected and standby power is available, one elevator at a time from each group will be lowered to a pre-designated landing and will open the doors. After passengers have exited the elevator, the doors are closed and the car shuts down. The next available car in the group will then be selected to lower, allow passengers to exit, close the doors and shutdown. This process is repeated until all cars in the group have been lowered and parked. At this time, an elevator is automatically allowed to continue service using the building-supplied standby power. A manual

selection switch is available to override the automatic selection and allow and car in the group to provide service to the building. When normal power is restored, the elevators automatically resume operation.

2.08 MATERIALS

- A. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- B. Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel), with matte finish.
- C. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.
- D. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- E. Resilient Flooring: Vinyl tile flooring and Resilient base, as specified in Section 09 6500, Type VCT-4.

2.09 CAR AND HOISTWAY ENTRANCES

- A. Elevator, Numbers 1 and 2:
 - 1. Car and Hoistway Entrances, Each Elevator Floor Lobby:
 - a. Hoistway Fire Rating: 2 Hours.
 - b. Elevator Door Fire Rating: 1-1/2 Hours.
 - c. Framed Opening Finish and Material: Brushed stainless steel.
 - d. Car Door Material: Stainless steel, with rigid sandwich panel construction.
 - e. Hoistway Door Material: Stainless steel, with rigid sandwich panel construction.
 - f. Door Type: Single leaf.
 - g. Door Operation: Side opening, two speed.

2.10 CAR EQUIPMENT AND MATERIALS

- A. Elevator Car, Numbers 1 and 2:
 - 1. Car Operating Panel: Provide main and auxiliary; flush-mounted applied face plate, with illuminated call buttons corresponding to floors served with "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, and alarm button.
 - a. Panel Material: Integral with front return; one per car.
 - b. Car Floor Position Indicator: Above door with illuminating position indicators.
 - c. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch above car finished floor.
 - d. Provide service cabinet integral with front return panel, with hinged door and keyed lock in each car.
 - e. Provide following within service cabinet as part of car operating panel:
 - 1) Switch for each auxiliary operational control, keyed.
 - 2) Switches for fan, light, and inspection control.
 - 3) Emergency light.
 - 4) Telephone cabinet and hard-wired connection with telephone.
 - 5) Control for each other special feature specified.
 - f. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.
 - g. Special Equipment: Limited Access Operation: Keyswitch and card reader space.(card reader by others).
 - 2. Ventilation: Single speed fan with grille in ceiling.
 - 3. Flooring: Resilient vinyl tile.
 - 4. Wall Base: Resilient base, 4 inch high.

5. Front Return Panel: Match material of car door.
 6. Door Wall: No. 4 brushed stainless steel.
 7. Side Walls: No. 4 brushed stainless steel.
 8. Rear Wall: No. 4 brushed stainless steel.
 9. Hand Rail: Stainless steel, at each side wall. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
 - a. Flat Bar Stock, Solid: 1/4 inch thick by 2 inch high.
 - b. Stainless Steel Finish: No. 4 Brushed.
 10. Canopy: Cold-rolled steel with hinged exit.
 11. Ceiling:
 - a. Canopy Ceiling: Stainless steel.
 - b. Frame Finish: Powder coated, Architect selected color.
 - c. Lay-in Panel: Translucent, polycarbonate panels.
 - d. Lighting: Manufacturer's standard LED lighting.
- B. Car Accessories:
1. Protective Pads: Canvas cover, padded with impact-resistant fill material, sewn with piping edges; fire resistant in compliance with ASME A17.1; brass grommets for supports, covering side and rear walls and front return, with cut-out for control panel; provide one set for each elevator.
 - a. Color: Tan.
 - b. Provide at least 4 inch clearance from bottom of pad to finished floor.
 - c. Pad Supports: Stainless steel studs, and mounted from ceiling frame.

2.11 FINISHES

- A. Powder Coat on Steel: Clean and degrease metal surface; apply one coat of primer; two coats of powder coat.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway and pit are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify that electrical power is available and of correct characteristics.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components. Comply with requirements of Section 01 5000 - Temporary Facilities and Utilities.
- B. Maintain elevator pit excavation free of water.

3.03 INSTALLATION

- A. Coordinate this work with installation of hoistway wall construction.
- B. Install system components, and connect equipment to building utilities.
 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
- C. Provide conduit, electrical boxes, wiring, and accessories. Refer to Sections 26 0533.13 and 26 0583.
 1. Comply with the National Electrical Code for electrical work required during installation.
- D. Mount machines and motors on vibration and acoustic isolators.
 1. Place on structural supports and bearing plates.
 2. Securely fasten to building supports.

- 3. Prevent lateral displacement.
- E. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- F. Install guide rails to allow for expansion and contraction movement of guide rails.
- G. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- H. Bolt brackets to inserts placed in concrete form work.
- I. Field Welds: Chip and clean away oxidation and residue with wire brush; spot prime with two coats.
- J. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- K. Fill hoistway door frames solid with grout in accordance with Section 04 2000.
- L. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime with two coats.
- M. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.
- N. Adjust equipment for smooth and quiet operation.

3.04 TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

- A. Testing and inspection by regulatory agencies will be performed at their discretion.
 - 1. Schedule tests with agencies and notify Owner and Architect.
 - 2. Obtain permits as required to perform tests.
 - 3. Document regulatory agency tests and inspections in accordance with requirements.
 - 4. Perform tests required by regulatory agencies.
 - 5. Furnish test and approval certificates issued by authorities having jurisdiction (AHJ).
- B. Operational Tests:
 - 1. Perform operational tests in the presence of Owner and Architect.
 - 2. Test multiple elevator system by transporting at least three persons up from main floor during a five minute period with maximum average time interval of 10 seconds between cars, with both cars leaving main floor during same five minute period.
 - 3. At an agreed time, and the building occupied with normal building traffic, conduct tests to verify performance.
 - a. Furnish event recording of each landing call registrations, time initiated, and response time throughout entire working day.
 - 4. Set period of time elevator takes to travel between typical floor landings at not more than 3.8 seconds.
 - a. Measure time from moment doors start to close until car has stopped level at next floor landing and doors are opening.

3.06 ADJUSTING

- A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.

3.07 CLEANING

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.

3.08 CLOSEOUT ACTIVITIES

- A. Demonstrate proper operation of equipment to Owner's designated representative.
- B. Demonstration: Demonstrate operation of system to Owner's personnel.
 - 1. Use operation and maintenance data as reference during demonstration.
 - 2. Briefly describe function, operation, cleaning and maintenance of each component.

3.09 PROTECTION

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch-up, repair, or replace damaged products and materials before Date of Substantial Completion.

3.10 MAINTENANCE

- A. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for three months from Date of Substantial Completion.
- B. Submit proposal for continuation of Maintenance Contract in accordance with ASME A17.1 and requirements as indicated for installed elevator equipment.
- C. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or installer.
- D. Maintenance contract services shall not be assigned or transferred to any agent or other entity without prior written consent of Owner.
- E. Examine system components periodically.
- F. Include systematic examination, adjustment, and lubrication of elevator equipment.
- G. Maintain and repair or replace parts, whenever required, using parts produced by original equipment manufacturer.
- H. Replace wire ropes when necessary to maintain the required factor of safety.
- I. Perform work without removing cars from use during peak traffic periods.
- J. Provide emergency call back service during regular working hours throughout period of this maintenance contract.
- K. Maintain an adequate stock of parts for replacement or emergency purposes, and have personnel available to ensure the fulfillment of this maintenance contract without unreasonable loss of time.

END OF SECTION