Addendum #2

FOR

City of Pearl Parks and Recreation-Phase 3
Pearl, MS

November 16, 2020

PICKERING FIRM, INC.
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Flowood, MS 39232
601-956-3663

Pickering

DATE: November 16, 2020

PROJECT: **City of Pearl Parks and Recreation-Phase 3**
Pearl, MS

NOTICE TO ALL BIDDERS: This Addendum modifies (changes, adds to, deletes from) and/or interprets the Bidding Documents (Project Manual and/or Drawings, as indicated), and becomes part of the Contract Documents when the Agreement between the Owner and Contractor is executed.

Project Manual

Architectural

1. Add architectural technical specifications being furnished with this addendum.

PARKS AND RECREATION PHASE III SOCCER CONCESSION
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November 6, 2020

SPECIFICATIONS

SECTION 04 05 11
MORTAR AND MASONRY GROUT

1.1 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.2 RELATED REQUIREMENTS

A. Section 04.2000 - Unit Masonry: Installation of mortar and grout.

B. Section 08.1113 - Hollow Metal Doors and Frames: Products and execution for grouting steel door frames installed in masonry.

1.3 REFERENCE STANDARDS

A. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

B. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

C. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2011b.

D. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

E. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2012.

F. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2010.

G. ASTM C1142 - Standard Specification for Extended Life Mortar for Unit Masonry; 1995 (Reapproved 2013).

1.4 SUBMITTALS

A. See Section 01.3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Keep packaged materials in original packages until ready for use.

C. Store cement and other materials in waterproof area with elevated floor.

1.6 FIELD CONDITIONS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 MORTAR AND GROUT APPLICATIONS

A. Use only factory premixed packaged dry materials for mortar and grout, with addition of water only at project site.
   1. Exception: If a specified mix design is not available in a premixed dry package, provide equivalent mix design using standard non-premixed materials.

B. Mortar Mix Designs: ASTM C270, Property Specification.
   1. Masonry below grade and in contact with earth: Type S.
   2. Exterior Masonry Veneer: Type N.
   3. Exterior Cavity Walls: Type S mortar with Type N pointing mortar.
   4. Exterior, Non-loadbearing Masonry: Type N.
   5. Interior, Non-loadbearing Masonry: Type N.

2.2 MATERIALS

A. Use the same brand of cementitious materials and the same source of sand supply throughout the entire project. Basis if design product: Ashegrove Mortar

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

C. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

D. 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.

E. Water: Clean and potable.
   1. Water shall be clean and free from deleterious acids, alkalis, and organic matter.

2.3 MORTAR MIXING

A. Ready Mixed Mortar: ASTM C1142, Type equivalent to that specified according to ASTM C270.

B. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

C. Maintain sand uniformly damp immediately before the mixing process.

D. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.

E. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

F. Do not use anti-freeze compounds to lower the freezing point of mortar.

G. If water is lost by evaporation, re-temper only within two hours of mixing.

2.4 GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

2.5 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01.4000 - Quality Requirements.

B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Use methods to assure specified proportions of materials can be controlled and accurately maintained. Measure materials by volume, unless otherwise directed by manufacturer’s proprietary instructions.

C. Mortar shall be mixed and placed in final position within 60 minutes after mixing when the air temperature is 80° F or higher. Mortar shall be mixed and placed in final position within 90 minutes when air temperature is less than 80° F. Mortar not used within these time limits shall be discarded.

D. Mortars that have stiffened within the time intervals specified herein because of evaporation of moisture may be re-tempered to restore workability by adding water. Water may; be added as is necessary to produce proper workability.

E. Work grout into masonry cores and cavities to eliminate voids.

F. Do not install grout in lifts greater than 16 inches (400 mm) without consolidating grout by rodding.

G. Do not displace reinforcement while placing grout.

H. Remove excess mortar from grout spaces.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete Block.

B. Concrete Brick.

C. Clay Facing Brick.

D. Common Brick.

E. Reinforcement and Anchorage.

F. Flashings.

G. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 04.0511 - Mortar and Masonry Grout.

B. Section 07.9200 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).

C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.

D. ASTM C55 - Standard Specification for Concrete Building Brick; 2011.

E. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2013.

F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.

G. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.

H. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2014.

I. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

J. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013.

K. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2008).

L. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2014.

M. ASTM C1634 - Standard Specification for Concrete Facing Brick; 2011.

N. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2014.

O. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.

P. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.

Q. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2005.

1.4 ADMINISTRATIVE REQUIREMENTS

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

1.5 SUBMITTALS

A. See Section 01.3000 - Administrative Requirements, for submittal procedures.

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

C. Shop Drawings: To illustrate extends of Ground Face CMU, Split Face CMU, Single Wythe waterproofing system. Indicate special shape required to make transitions at corners, openings and wall terminations.

D. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

F. Furnish samples for the following items:
   1. One full size sample of each specified type of concrete masonry unit.
   2. One each of embedded masonry accessories.

G. 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.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum 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.

C. Single Source Responsibility for masonry units: Obtain exposed masonry units of uniform texture and color. Concrete masonry units that vary in texture or color shall be culled and removed from the site.

D. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality for all exposed masonry from one manufacturer for each cementitious component and from one source and producer for each aggregate.

E. Pre – Installation Meeting: Contractor shall schedule a Concrete Masonry pre- installation meeting with Architect, General Contractor, masonry and mortar product representatives, and installer prior to installation of CMU walls to discuss job specific and standard installation procedures.

F. Quality of Masonry Units: All masonry units shall be uniform in color, texture and size with sharp straight corners and without chipped or broken corners or faces. Exposed masonry units with chipped or broken corners, faces or other defects shall be culled and discarded. All such units placed in a wall shall be removed and replaced. Concrete blocks shall conform to ASTM C90 TYPE 1. The provisions of ASTM C90 Paragraph 7.3.1 apply with regard to imperfections. The exception being no chip larger than 1/4” diameter and no dimensional tolerances larger than 1/16” shall be installed.

1.7 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end

dam) in mock-up. Upon written approval of the Architect, this panel will become the quality standard for the job and be incorporated into the work. Any work which fails to meet the approved standard will be removed and replaced without additional cost to the Owner.

B. Locate where directed.

C. Mock-up may remain as part of the work if directed by the Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

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

B. Handle and protect all materials so as to protect them against staining, breakage, deterioration and mixture with non approved materials. Keep palletized materials in original condition until ready for use.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on the drawings for specific locations.
   2. Load-Bearing Units: ASTM C90, normal weight.
      a. Exposed Faces: Manufacturer's standard color and texture where indicated.
   3. Non-Loadbearing Units: ASTM C129.
      a. Hollow block, as indicated.
   4. Hollow concrete masonry units to comply with ASTM C-90, Grade N, Type I in color "Natural Gray," having a compressive strength of 1,900 PSI. All block surfaces shall be uniform in texture and color.
   5. Standard Block: Block shall be 8"x16" nominal modular face, thickness indicated on drawings.
   6. Solid Concrete Masonry Units: To comply with ASTM C-145, Grade N, with an average compressive strength of 1,800 PSI.
   7. Special Shape Concrete Masonry Units: Proved accessory shapes as indicated or otherwise required to include flush end, halves, lintel block, "U" blocks, jamb blocks, solid bull-nose wall caps and other special shapes.
   8. Ground Face Masonry Units:
      a. Ground face units shall be manufactured by "Decrastone" as manufactured by DIV2-4 a division of Tupelo Concrete Products, Inc, 120 Industrial Road North, Tupelo, MS 38801, 1-800-748-8703 or equal.
      b. Top and Bottom Surfaces are ground to provide finished dimensions of 7 5/8"x 15 5/8". Bed depth dimensions for single face units are 3 9/16", 5 9/16", 7 9/16", 11 9/16", 1/16". Two face units are 3 1/2 " 5 ½", 7 ½", 11 ½", 1/16".
      c. Water Repellency: Integral Repellant as outlined below.
      d. Color: to be selected by architect from manufacturer's full range.
      e. Provide ground face units on all faces shown on the floor plans plus additional surfaces at all door heads, jambs, exposed corners and lintels.
   9. Split Face Masonry Units:
      a. Split face units shall be manufactured by "Decrastone" as manufactured by DIV2-4 a division of Tupelo Concrete Products, Inc, 120 Industrial Road North, Tupelo, MS 38801, 1-800-748-8703 or equal. To comply with ASTM C-90, Grade N, Type 1 having a compressive strength of 1,900 PSI.

b. Sizes and Shape: As indicated on the drawings.
c. Color: to be selected by architect from manufacturer's full range.
d. Provide units that have split faces where ever exposed to view at corners but not at lintels or window and door heads and jambs

10. Units with Integral Water Repellent: Concrete block units as specified in this section with a polymeric liquid admixture added to concrete masonry units approved by the block manufacturer 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 (0.05 L 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 and grout that also has integral water repellent admixture.
    c. Use water repellent admixtures for masonry units, mortar and grout by a single manufacturer.
    d. Field Applied sealer to be applied only if required by block manufacturer.
    e. Manufacturers:
        1) ACM Chemisteries, Inc.: Rainbloc; www.acmchem.com.
        2) Substitutions: See Section 01.6000 - Product Requirements.

B. Concrete Brick:
    1. For below grade use, ASTM C1634 (or ASTM C55, Grade N), normal weight.

2.2 BRICK UNITS

A. Basis of Design Manufacturer for facing modular brick:
    1. Meridian Brick, https://www.meridianbrick.com/ Selected Brick: Wellington Modular
    2. Brick must match City of Pearl's Parks and Rec existing baseball/softball concession stands.

B. Architect to approve submittal sample. Brick installed on site must match architect's approved sample.

2.3 MORTAR AND GROUT MATERIALS

A. Mortar and Grout: As specified in Section 040511.

2.4 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
    1. Hohmann & Barnard, Inc: www.h-b.com/sle.
    2. or approved equal.

B. Continuous type of standard manufacture, hot-dipped galvanized truss design. Reinforcement shall have not less than No. 9 steel wire cross rods and No. 9 deformed side rods conforming to ASTM A-153, Class B2. Use proper width for wall thicknesses as shown on the drawings. Anchors of various types as required.

C. At all CMU partition intersections: Use #344 Galvanized rigid partition anchors at 16” o.c. vertical, as manufactured by Hohmann & Barnard or Architect’s approved equal, grouting one (1) cell in each of the intersecting partitions full height.

D. Furnish complete prefabricated corners and tees.

E. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.

F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face.

G. Two-Piece Wall Brick Ties: Formed steel wire, 0.1875 inch (4.8 mm) thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in (32 mm). Install spaced at 16" o.c. vertical and 32” o.c. horizontal.

H. 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 (1.91 mm) 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 (4.75 mm) thick.
   3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).

I. Control joint wall ties: shall be equal to Hohmann & Barnard Slip-set Stabilizer, hot-dipped galvanized using
   1. PVC control joint: shall be equal to Hohmann & Barnard #VS-Standard. PVC material shall conform to ASTM D-2287 and tested in conformance with ASTM D-2240.
   2. Type “H” for horizontal mortar joint and type “V” to connect to intersecting wall. Ties shall be placed 16” o.c. max. vertically.

2.5 FLASHINGS

A. Refer to Section 07.6200.

2.6 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/sle or approved equal.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self-expanding
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/sle or approved equal.

C. Termination Bars: Stainless steel; compatible with membrane and adhesives.

D. Drip Edge: Stainless steel; compatible with membrane and adhesives.

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

F. Weeps:

1. Weep Products: Use the following, unless otherwise indicated:
   a. Type: cotton cord 3/8" thick.

G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 - EXECUTION

3.1 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.

3.2 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.

3.3 COLD AND HOT WEATHER REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

3.4 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 unless specifically indicated on drawings.
   2. Mortar Joints: Concave.

3.5 PLACING AND BONDING

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

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Employ solid bricks @ ends of rowlock sills and all other locations where holes may be visible.

E. Remove excess mortar and mortar smears as work progresses.

F. Interlock intersections and external corners, except for units laid in stack bond.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

J. Joint treatment:
   1. Exposed block: Make joints uniform, approximately 3/8" (plus or minus a maximum variance of 1/16") wide, tool and compress concave joint using 18" long tool on each side

unless otherwise noted in drawings or below. Mortar joints should be tooled to a concave profile when the mortar is thumbprint hard.

2. Concealed Block: Make joints uniform approximately 3/8" wide, cut mortar flush with face of block.
3. Point and fill flush all exterior cavity side masonry joints as work progresses. Do not leave any voids or cracks larger than 1/32" or excess mortar or mortar residue on surface. Architect must inspect and approve surface prior to installation of dampproofing or waterproofing.

K. Protect all exposed masonry during construction against staining and excess mortar. As the work progresses, clean mortar daubs, smears and residue from masonry work before it sets up. No anti-freeze ingredient shall be used.

3.6 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

B. Use 3/8" cotton cord weeps. Extend cord up face of drainage plane 18" and tape. Extend cord out of wall no less than 3" beyond face of masonry. Once project is complete, cut all cords back to 1" from face of masonry.

3.7 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Rake backside of brick/block to help maintain a clean cavity.

C. Cavity netting is not permitted.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

B. Place continuous joint reinforcement in first and second joint below top of walls.

C. Lap joint reinforcement ends minimum 6 inches (150 mm).

D. 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 (900 mm) horizontally and 24 inches (600 mm) vertically.

E. Install trussed or ladder wall reinforcing in the first and second bed joint and at 16" o.c. vertically elsewhere. Lap side rods at splices at least 6" and per manufacturer's minimum requirements. Use pre-fabricated corner units at all corners and intersections for anchoring abutting walls and partitions.

F. Cut or interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

G. Install control and expansion joints in unit masonry where indicated. Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

3.9 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement 8 inches (200 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

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 (152 mm), minimum, into adjacent masonry or turn up at least 8 inches (203 mm), minimum, to form watertight pan at non-masonry construction.

B. Extend metal flashings to within 1/4 inch (6 mm) of exterior face of masonry.

C. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.11 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. Control joints shall be spaced no further than 25’ in center. See Architect for clarification on locations and pattern.

3.12 INSPECTION

A. Architect to inspect laid masonry at an interval of 4' 0" in height for all types of masonry listed above.

B. Contractor is to provide 24 hours notice for all masonry inspections.

C. Work deemed non-conforming in terms of tolerances, finish and cleanliness of cavity will be redone.

D. Once the Contractor has exhibited consistent conformance to the standards herein, the interval of inspection may be adjusted by the Architect.

3.13 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

C. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

3.14 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. On completion, fill all holes and joints. Remove loose mortar. All daubs, smears and mortar residue left on wall surface shall be cleaned by scraping or wire brushing.

E. Masonry joints and masonry units that cannot be pointed up and cleaned to the Architect’s satisfaction shall be removed and replaced.

F. Keep walls clean daily during installation using brushes, rags, and burlap squares. Do not allow excess mortar lumps, smears or residue to harden on the finished concrete masonry surfaces. Remove green mortar with burlap or dry cloth. Harsh cleaning methods after walls have been erected may affect the visual appearance and surface of the blocks and shall be avoided. All work that cannot be cleaned to the Architect’s satisfaction shall be removed and replaced.

G. Final cleaning: Clean the completed walls with a detergent masonry cleaner strictly following the manufacturer’s instructions including thorough rinsing. For standard exposed concrete

masonry walls, use “Sure Klean” custom masonry cleaner or Architect’s approved equal. Follow manufacturer’s instructions for application.

H. Cut cotton cords off 1" away from face of masonry.

I. No acid or acid based solutions shall be used in the cleaning of the finished concrete masonry units. Use only commercially prepared detergent cleaning agent applied in accordance with the manufacturer's instructions and approved by the brick manufacturer for use on his products. Before applying any cleaning agent to an entire wall, apply agent to a sample wall area in a location approved by the Architect.

3.15 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 06 46 00

WOOD TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior running wall base.
   2. Wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

B. Related Requirements:
   1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, and shims required for installing wood trim and concealed within other construction before wood trim installation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products, fire-retardant-treated materials and finishing materials and processes.
   1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Show details full size.
   2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

C. Samples for Initial Selection:
   1. Shop-applied transparent finishes.

D. Samples for Verification:
   1. Lumber for transparent finish, not less than 5 inches wide by 12 inches long], for each species and cut, finished on one side and one edge.
   2. Lumber and panel products with shop-applied opaque finish, 5 inches wide by 12 inches long for lumber and 8 by 10 inches] for panels, for each finish system and color, with one-half of exposed surface finished.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.4 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. Installer Qualifications: Fabricator.

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

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockups of typical wood base as shown on Drawings.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver wood trim until operations that could damage wood trim have been completed in installation areas. If wood trim must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

A. Weather Limitations for Exterior Work: Proceed with installation of exterior wood trim only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

B. Environmental Limitations for Interior Work: Do not deliver or install interior wood trim until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

C. Environmental Limitations for Interior Work: Do not deliver or install interior wood trim until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that wood trim can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 WOOD TRIM, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of wood trim indicated for construction, finishes, installation, and other requirements.
   1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

2.2 INTERIOR WOOD BASE FOR TRANSPARENT FINISH

A. Grade: Custom.

B. Wood Species and Cut:
   1. Species: Yellow Pine
   2. Cut: Plain sliced/plain sawn.
   3. Provide split species on trim that faces areas with different wood species, matching each face of woodwork to species and cut of finish wood surfaces in areas finished.

C. Base Size: 1/2" inches by 6 “ inches

D. For base wider than available lumber, glue for width. Do not use veneered construction.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood trim and quality grade specified unless otherwise indicated.
   1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
   2. Wood Moisture Content for Interior Materials: 5 to 10 percent.

2.4 MISCELLANEOUS MATERIALS

A. Interior Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.

C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

D. Adhesives: Do not use adhesives that contain urea formaldehyde.

2.5 FABRICATION

A. Fabricate wood base to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.

B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members except for members with ends exposed in finished work.

2.6 SHOP PRIMING

A. Interior Wood Trim for Transparent Finish: Shop seal with stain (if required), other required pretreatments, and first coat of finish as specified in Section 09 93 00 "Staining and Transparent Finishing."

B. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing wood trim, as applicable to each unit of work.

2.7 SHOP FINISHING

A. General: Finish wood trim at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

B. General: Drawings indicate items that are required to be shop finished. Finish such items at fabrication shop as specified in this Section. Refer to Section 09 93 00 "Staining and Transparent Finishing" for field finishing wood trim not indicated to be shop finished.

C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing wood trim, as applicable to each unit of work.

EXECUTION

2.8 PREPARATION

A. Before installation, condition wood trim to average prevailing humidity conditions in installation areas.

B. Before installing architectural wood trim, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

2.9 INSTALLATION

A. Grade: Install wood base to comply with same grade as item to be installed.

B. Assemble wood base and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install wood base level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut wood base to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor wood base to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
   1. For shop-finished items, use filler matching finish of items being installed.

F. Wood Base: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
   1. Fill gaps, if any, between top of base and wall with plastic wood filler; sand smooth; and finish same as wood base if finished.
   2. Install wood base with no more variation from a straight line than 1/8 inch in 96 inches.

G. Touch up finishing work specified in this Section after installation of wood trim. Fill nail holes with matching filler where exposed.
   1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are applied in shop.

2.10 ADJUSTING AND CLEANING

A. Repair damaged and defective wood trim, where possible, to eliminate functional and visual defects; where not possible to repair, replace wood trim. Adjust joinery for uniform appearance.

B. Clean wood trim on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 06 64 00
PLASTIC PANELING (FRP)

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Fiberglass reinforced plastic (FRP) paneling for wall and ceiling surfaces, including trim accessories.

1.2 REFERENCES

A. General: Standards listed by reference form a part of this specification section. Standards listed are identified by issuing authority, abbreviation, designation number, title or other designation. Standards subsequently referenced in this Section are referred to by issuing authority abbreviation and standard designation.

B. ASTM International:

1. ASTM D256 – Standard Test Methods For Determining the Izod Pendulum Impact Resistance of Plastics.
2. ASTM D570 – Standard Test Method For Water Absorption of Plastics.
3. ASTM D638 – Standard Test Method For Tensile Properties of Plastics.
4. ASTM D2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
5. ASTM D5319 – Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
6. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Basis of Design: Crane Composites

1. Installation Guide For FRP Panels #6876.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Conduct preinstallation meeting to clarify Project requirements, substrate conditions, manufacturer’s installation instructions and manufacturer’s warranty requirements.

1.4 ACTION SUBMITTALS

A. Product Technical Data: For each type of product required.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.

B. Warranty: Warranty documents required in this section.

1.6 MAINTENANCE MATERIAL

A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 01 Closeout Submittals Section.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Provider of advanced installer training.

B. Installer Qualifications:

1. At least five years' experience in the installation of fiberglass reinforced plastic panels.
2. Experience on at least five projects of similar size, type and complexity as this Project.
3. Employer of workers for this Project who are competent in techniques required by manufacturer for installation indicated.

C. Surface-Burning Characteristics: Determined by testing identical products according to ASTM E84 by a testing agency acceptable to authorities having jurisdiction.

1. Flame-Spread Index: 200 (Class C) or less
2. Smoke-Developed Index: 450 or less.

E. Meets USDA/FSIS requirements.

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.

B. Storage and Handling: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels in a dry indoor location at Project site. Remove any foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.9 PROJECT CONDITIONS

A. Ambient Conditions:

1. Do not begin installation until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.
2. During installation, and within 48 hours prior to installation, maintain ambient temperature and relative humidity within limits required by type of panel adhesive used and recommendation of panel adhesive manufacturer.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace FRP panels that fail within specified warranty period.

1. Failures shall include, but not be limited to substantial defects in material and workmanship, rotting, rusting, corrosion, development of structural surface cracks, or requiring painting or refinishing.
2. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.1 FIBERGLASS REINFORCED PLASTIC (FRP) PANELS

A. General: Fiberglass reinforced plastic panels complying with ASTM D5319.

B. Basis of Design Product: Crane Composites, Inc. Innovative Finishes DESIGNS Wall Panel

C. Substitution Limitations: Architect’s approved equal

D. Product Options:
1. Pattern: To be selected by Architect from manufacturers available patterns.
2. Surface Finish: Reference Finish Schedule.
3. Nominal Thickness: 0.075 inch (1.9 mm).
4. Wall Panel Size: 4’x10’ or as indicated on drawings
5. Color: to be selected during submittal phase: white, cream, or grey

F. Performance Criteria (Class C Panels):

1. Flexural Strength: 15,000 psi (110 Mpa), ASTM D790.
2. Tensile Strength: 8,000 psi (55 Mpa), ASTM D638.
3. Barcol Hardness: 45, ASTM D2583.
4. Impact Strength (IZOD): 5 ft-lb/sq in (0.27 J/mm) ASTM D256, showing no visible damage on finish side.
5. Water Absorption: 0.16 percent in 24 hours at 77 deg F (25 deg C), ASTM D570.

2.2 ACCESSORIES

A. Moldings: As selected by Architect from manufacturer's full product range.

B. Panel Adhesive: As recommended by panel manufacturer for the required substrates.

1. Adhesive shall have a VOC content of 50 > g/L or less.

2.3 SOURCE QUALITY CONTROL

A. Obtain fiberglass reinforced panels, moldings and other accessories from a single manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. General: Comply with manufacturer's product data, including product technical bulletins, and installation instructions in product catalogs and product packaging.

B. Verify that substrates previously installed under other sections are acceptable for product installation in accordance with FRP manufacturer's instructions.

1. Examine substrate surfaces to determine that corners are plumb and straight, that surfaces are smooth, sound and uniform, that nails or screw fasteners are countersunk, and that joints and cracks are filled flush and smooth with adjoining surfaces.
2. Do not begin panel installation until substrate surfaces are in satisfactory condition.

3.2 PREPARATION

A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust or other contamination.

B. Condition panels by unpacking and placing in installation space no less than 24 hours before installation.

C. Lay out paneling before beginning installation. Locate panel joints to provide equal panel widths at ends of walls and so that trimmed panels at corners are not less than 12 inches (300 mm) wide.

3.3 INSTALLATION

A. General: Comply with panel manufacturer's Installation Guide #6876.

B. Cut and drill panels, finished face down, with carbide tipped saw blades or drill bits, or cut with snips.

C. Install panels with manufacturer's recommended gap for panel field and corner joints.

1. Pre-drill fastener holes in panels, 1/8 inch (3.2 mm) greater in diameter than fastener.
2. Install panels in a full spread of adhesive. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

D. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.

E. Sealant:

1. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
2. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths.

3.5 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

B. Repair or replace any installed products that have been damaged.

C. Clean installed panels in accordance with manufacturer's instructions prior to Owner's acceptance.

D. Remove and lawfully dispose of construction debris from project site.

3.6 PROTECTION

A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION

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SECTION 07 20 00
INSULATION

PART 1 - GENERAL

1.01 SCOPE

A. The work required under this section consists of roof, deck, and wall insulation and other related items necessary to complete the work as indicated in the contract documents.

1.02 STORAGE AND HANDLING

A. Materials shall be delivered to job site in manufacturer's unbroken containers and stored in suitable storage area for protection of surfaces and edges.

1.03 SUMITALLS

A. Submit evidence to the Architect that the polyisocyanurate foam insulation board adhesive, for use in exterior architectural cavity wall application will be compatible with the brushed on dampproofing at the CMU or Concrete surface.

PART 2 - PRODUCTS

2.01 EXTERIOR WALL BATT INSULATION

A. R-21 Batt Insulation: Owens Corning 5-1/2" Nominal thickness unfaced insulation. Flame spread 25 (Class A) 23” width batts. Locate where indicated on drawings.

2.02 CEILING BATT INSULATION

A. R-38 Batt Insulation: Owens Corning 10-1/2" Nominal thickness unfaced insulation. Flame spread 10 (Class A) 23” width batts. Locate where indicated on drawings.
B. Chicken Wire: Utilize as needed.

2.03 SOUND BATT INSULATION

A. 31/2” x 16” and 5-1/2”x16” Owens Corning Sound Attenuation Batt Insulation Unfaced. Flame Spread 10 (Class A). Locate in walls surrounding restrooms.

2.04 ROOF INSULATION BAFFLE

A. Owens Corning RAFT-R-MATE ® Attic Rafter Vents. Size 22 ½” x 48”. Cut and use per manufacturers recommendations.

PART 3 - EXECUTION

3.01 BATT INSULATION AT EXTERIOR WALLS

A. Install insulation between studs, friction fit between studs, after cover material has been installed on one side of the cavity, use wire or metal straps to hold insulation in place. At faced insulation attach flanges to studs or tape to face of the metal studs prior to installing finish.

3.02 BATT INSULATION ABOVE SUSPENDED AND GYPSUM CEILINGS

A. Install insulation over ceiling panels. Butt insulation together tightly to prevent thermal leaks.

3.03 CONSTRUCTION/SAFING JOINTS

A. Install UL rated one hour Fire Caulk at all joints and penetrations at all rated walls, wall/ceiling intersections, and wall/roof intersections. Submit Manufacturers UL Number of each condition prior to purchasing product.

3.04 SOUND BLANKET ISULATION

A. Install insulation between wood studs, friction fit between studs, after cover material has been installed on one side of the cavity, use wire or metal straps to hold insulation in place.

B. Install insulation over ceiling panels where indicated in the Drawings. Butt insulation together tightly together.

END OF SECTION

SECTION 07 26 16

BELOW-GRADE VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Vapor retarders for below slabs-on-grade.

B. Related Requirements:
   1. Section 03 30 00 “Cast-In-Place Concrete” for cast-in-place concrete.
   2. Section 07 21 00 “Thermal Insulation” for vapor retarders installed with insulation.

1.2 ACTION SUBMITTALS

A. Product Data.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For vapor retarder, signed by manufacturer.

PART 2 - PRODUCTS

2.1 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum perm rating of 0.03. Include manufacturer's recommended adhesive and/or pressure-sensitive tape.
   1. Basis of design: Stego Industries, LLC; Stego Wrap 15 mil Class A. or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the vapor retarder.
   1. Verify that compacted subgrade and granular course is dry, smooth, sound, and ready to receive vapor barrier.
   2. Vapor barrier shall be clean and free from all dirt and debris prior to placing concrete.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints min. 6 inches and seal with manufacturer's recommended tape.
   2. Securely tape all joints and penetrations through vapor barrier.

3.3 PROTECTION, REPAIR, AND CLEANING

A. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

END OF SECTION

SECTION 07 27 26

WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid-applied, vapor-permeable membrane air barriers, including substrate joint treatment.

B. Related Requirements:
   1. Section 06 16 00 "Sheathing" for wall sheathings.

1.2 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

D. Water vapor permeability: Time rate of water vapor transmission through a material at a specific thickness.

E. Water vapor transmission: Rate of water transmission through a material of a constant thickness at a given time. The method of testing is ASTM E96.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

B. Shop Drawings: For air-barrier assemblies.
   1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
   2. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.

B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
   1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
   1. Build integrated mockups of exterior wall assembly as shown on Drawings, but not less than 150 sq. ft., incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
      a. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
      b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
      c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Mock up may remain as part of the work once approved by the Architect.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.

B. Mockup Testing: Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.
   1. Qualitative Air-Leakage Testing: Mockups will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers.
   2. Adhesion Testing: Mockups will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. according to ASTM D 4541.
   3. Notify Architect seven days in advance of the dates and times when mockups will be tested.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
   1. Protect substrates from environmental conditions that affect air-barrier performance.
   2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 283 or ASTM E 783.

2.3 WEATHER BARRIER MATERIALS

A. Weather Barrier Sheet Membrane, self-adhered:

   1. Basis of design product:
      a. Grace Ice & Water Shield manufactured by W. R. Grace & Co.–Conn., Grace Construction Products, Cambridge, MA or approved equal.
      b. Substitutions: See Section 01.6000 - Product Requirements.

B. Thru-Wall Flashing:

   1. Basis of design product:
      a. Perm-a-barrier wall flashing as manufactured by Grace Construction Products, Cambridge, MA or approved equal.
      b. Substitutions: See Section 01.6000 - Product Requirements.

2.4 ACCESSORY MATERIALS

A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.

B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.

C. Counterflashing Strip: Modified bituminous, 40-mil-thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil-thick, cross-laminated polyethylene film with release liner backing.

D. Butyl Strip: Vapor retarding, 30 to 40 mils thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.

E. Modified Bituminous Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil-thick polyethylene film with release liner backing.

F. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.

G. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

H. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

I. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

J. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

K. Modified Bituminous Transition Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil-thick polyethylene film with release liner backing.

L. Elastomeric Flashing Sheet: ASTM D 2000, minimum 50- to 65-mil-thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners.

M. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

N. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07 92 00 "Joint Sealants."

O. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
   1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
   2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
   3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
   1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of fluid air-barrier material and embed a joint reinforcing strip in preparation coat.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of fluid air-barrier material at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air-barrier material over joint reinforcing strip.

3.4 TRANSITION STRIP INSTALLATION

A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
   1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
   2. Install butyl or modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

E. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply modified bituminous transition strip, adhesive-coated transition strip, or preformed silicone-sealant extrusion so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
   1. Modified Bituminous Transition Strip: Roll firmly to enhance adhesion.
   2. Adhesive-Coated Transition Strip: Roll firmly to enhance adhesion.
   3. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches o.c. Apply lap sealant over exposed edges and on cavity side of flashing sheet.
   4. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

I. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide strip as follows:
   1. Counterflashing strip for metal flashings.
   2. Modified bituminous strip for nonmetallic flashings.

J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.5 INSTALLATION OF THRU WALL FLASHING

A. General: Install flashing to dry surfaces at air and surface temperatures of -4ºC (25ºF) and above in accordance with manufacturer’s recommendations at locations indicated on Construction Documents.

B. Flexible Wall Flashing:

1. Precut pieces of flashing to easily handled lengths for each location.

2. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.

3. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.

4. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a steel hand roller.

5. Trim bottom edge 13 mm (1?2 in.) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.

6. At heads, sills and all flashing terminations turn up ends a minimum of 50 mm (2 in.) and make careful folds to form an end dam, with the seams sealed.

7. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.

8. Do not expose flashing membrane to sunlight for more than thirty days prior to enclosure.

C. Accessories:

1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture, apply manufacturer approved primer by air spray, brush or roller at the rate recommended by manufacturer, prior to flashing installation. Allow the primer to dry completely before flashing application.

2. Apply termination bar and a bead or trowel coat of mastic along flashing top edge, seams, cuts, and penetrations.

3.6 INSTALLATION OF SELF-ADHERED SHEET MEMBRANE

A. Installation: Strictly comply with manufacturer's installation instructions including but not limited to the following:

B. Schedule installation such that underlayment is covered by roofing within the published exposure limit of the underlayment.

C. Do not install underlayment on wet or frozen substrates.

D. Install when surface temperature of substrate is a minimum of 40 degrees F (5 degrees C) and rising.

E. Remove dust, dirt, loose materials and protrusions from deck surface.

F. Install membrane on clean, dry, continuous structural deck. Fill voids and damaged or unsupported areas prior to installation.

G. Prime concrete and masonry surfaces using specified primer at a rate of 500-600 square feet per gallon (12-15 sqm/L). Priming is not required for other suitable clean and dry surfaces.

H. Install membrane such that all laps shed water. Work from the low point to the high point of the roof at all times. Apply the membrane in valleys before the membrane is applied to the eaves. Following placement along the eaves, continue application of the membrane up the roof. Membrane may be installed either vertically or horizontally after the first horizontal course.

I. Side laps minimum 3-1/2 inches (89 mm) and end laps minimum 6 inches (152 mm) following lap lines marked on underlayment.

J. Patch penetrations and damage using manufacturer's recommended methods.

3.7 OPENINGS AND PENETRATIONS IN EXTERIOR WEATHER BARRIERS

A. Install flashing over sills, covering entire sill frame member, extending at least 5 inches (125 mm) onto weather barrier and at least 6 inches (150 mm) up jambs; mechanically fasten stretched edges.

B. 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 at least 4 inches (100 mm) wide; do not seal sill flange.

C. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches (230 mm) wide, covering entire depth of framing

D. At head of openings, install flashing under weather barrier extending at least 2 inches (50 mm) beyond face of jambs; seal weather barrier to flashing.

E. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.

F. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
   1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
   2. Continuous structural support of air-barrier system has been provided.
   3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
   4. Site conditions for application temperature and dryness of substrates have been maintained.
   5. Maximum exposure time of materials to UV deterioration has not been exceeded.
   6. Surfaces have been primed, if applicable.
   7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
   8. Termination mastic has been applied on cut edges.
   9. Strips and transition strips have been firmly adhered to substrate.
   10. Compatible materials have been used.
   11. Transitions at changes in direction and structural support at gaps have been provided.
   12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
   13. All penetrations have been sealed.

C. Tests: As determined by Owner's testing agency from among the following tests:
   1. Qualitative Air-Leakage Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers.
   2. Adhesion Testing: Air-barrier assemblies will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. according to ASTM D 4541 for each 600 sq. ft. of installed air barrier.

D. Air barriers will be considered defective if they do not pass tests and inspections.
   1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
   2. Remove and replace deficient air-barrier components for retesting as specified above.

E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

3.9 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
   1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 60 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
   2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION

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SECTION 07 41 00
METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 specification sections apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Provide all materials, labor, equipment, services and perform all operations in connection with the furnishing and installing of a complete roofing system, in accordance with the drawings and specifications, and including, but not limited to the following:
   1. A pre-formed and pre-finished mechanically-seamed, standing seam metal roofing system.
   2. Include perimeter flashing, trim ridge, valleys, gable closures, gutters, downspouts, flashing, fasteners, supplementary furring and supports and sealants required for a complete roofing system.
   3. Workmanship
   4. Inspection of surfaces
   5. Protection
   6. Delivery, samples and Shop drawings
   7. Guarantee and Warranty
   8. All other items as described in the Contract Documents.

1.3 RELATED SECTIONS

A. Section 06100 Rough Carpentry
B. Section 07100 Waterproofing
C. Section 07200 Insulation
D. Section 07600 Flashing and Sheet Metal
E. Section 07900 Caulking and Sealant

1.4 REFERENCES

A. American Architectural Manufacturer's Association (AAMA): www.aamanet.org:
   1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
   2. AAMA 809.2 - Voluntary Specification Non-Drying Sealants.
B. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
C. ASTM International (ASTM): www.astm.org:
   1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
3. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
4. ASTM A 980 - Standard Specification for Steel, Sheet, Carbon, Ultra High Strength Cold Rolled.
5. ASTM C 645 - Specification for Nonstructural Steel Framing Members.
6. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
7. ASTM D 1003 - Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.
8. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
9. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
10. ASTM E 1514 - Standard Specification for Structural Standing Seam Steel Roof Panel Systems.
11. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
12. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
13. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
14. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

D. FM Global (FM): www.fmglobal.com:
1. ANSI/FM 4471 - Approval Standard for Class 1 Panel Roofs.

E. International Accreditation Service (IAS):
1. IAS AC 472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, Part B.

F. Underwriters Laboratories, Inc. (UL): www.ul.com:

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: The roof system manufacturer shall meet and provide written certification stating:
1. The manufacturer has been regularly engaged in the fabrication of metal standing seam roof systems for at least ten (10) years. A brief list of similar projects shall be submitted with the shop drawings.
2. The manufacturer maintains a certified installer program for its products and maintains an up-to-date authorized roofing contractor list.
3. The manufacturer has a written warranty covering durability, color, and weather tightness of its roof system.

B. Roofer's Qualifications:
1. Installation of the standing seam metal roofing and roof-related accessories shall be performed by roofers authorized and qualified by the manufacturer as trained and qualified to erect the manufacturer's product.
2. The Roofing Contractor shall hold a Certificate of Responsibility Number and be classified as roofing and sheet metal.

3. All personnel installing metal roofing system shall hold a certificate from the Roofing manufacturer certifying that he/she has been trained by the Roofing Materials manufacturer and certifying he/she is qualified to install the specified system.

C. Manufacturer/Source: Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming, and accredited under IAS AC 472 Part B.

1.6 DESIGN CRITERIA

A. General: Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies and in accordance with the 2006 International Building Code.
B. System Performance: Comply with ASTM E 1514 and requirements of this Section.
C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
   1. Vertical Live Loads: Roof system shall be designed for a 25 PSF live load.
   2. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
      a. Wind Uplift Testing: Certify capacity of metal panels by actual testing of proposed assembly per ASTM E 1592.
   3. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with with no evidence of failure.
   4. Other superimposed dynamic and/or static loads such as exhaust fans and air conditioning equipment, shall be considered as part of the design requirements and combined with the normal design (live and wind) loads.
   5. Combination of normal load and auxiliary loads for design purposes shall be as prescribed and recommended in the 2006 International Building Code.
D. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class [UL-30] [UL-60] [UL-90].
E. FM Approvals Listing: Comply with FM Approvals 4471 as part of a panel roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 construction. Identify materials with FM Approvals markings.
   1. Fire/Windstorm Classification: [Class 1A-60] [Class 1A-75] [Class 1A-90] [Class 1A-105].
   2. Hail Resistance Rating: SH.
F. Air Infiltration, ASTM E 1680: Maximum 0.09 cfm/sq. ft. (0.457 L/s per sq. m) at static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).
G. Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 12 lbf/sq. ft. (575 Pa).
H. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
I. Roof panels shall be designed in accordance with Cold Formed Steel Design Manual, AISI - 1986.

1.7 SUBMITTALS

A. General: Submit the following in accordance with conditions of the Contract and Division 1 specification sections.
   1. Product data including manufacturer's specifications, standard details, certified product test results, installation instructions and general recommendations as applicable to materials and finishes for each component and for a total panel system.
   2. Samples of all specified metal panels and finishes. Provide 12 inch minimum length sample (full panel width) in the specified profile style and texture. Include clips, battens, fasteners, closures and other panel accessories.
   3. Shop drawings showing layout of all panels, details of all conditions, joints, corners, panel profiles, supports, anchorages, trim, flashing, gutters, closures, and special details. Distinguish between factory and field assembly work.
   4. Furnish a copy of SMACNA details to confirm details submitted conform to requirements.
   5. Sample warranty.
   6. Certificate of each roofing personnel.

1.8 COORDINATION

A. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.

1.9 WARRANTY

A. Roof Panels:
   1. Durability of the finished roof panels due to rupture, structural failure or perforation shall be warranted for a period of twenty (20) years by the manufacturer.
   2. The exterior color finish for roof panels shall be warranted by the manufacturer for twenty (20) years against blistering, peeling, cracking, flashing, checking and chipping.
   3. Excessive color change and chalking shall be warranted for twenty (20) years. Color change shall not exceed 5 NBS units per ASTM D2244-68T, Chalking shall not be less than a rating of 6 (white) or 8 (other colors) per ASTM D-659.

B. Weathertightness: The entire installation shall be guaranteed by a single source as weather tight for a minimum of twenty (20) years. Provide a 20 year written warranty, signed by the metal roofing manufacturer and his authorized installer agreeing to replace/repair defective materials and workmanship during the warranty period, but not to exceed the original cost of installation including labor and materials. The Warranty shall include all roofing components consisting of, but not limited to, roof panels, anchoring devices, metal flashing, ridge flashing, roof curbs, plumbing vent flashing and all other roof items furnished by the roofing manufacturer and other items installed by their approved roofing installer.

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver panels to job site with strippable coating, factory applied properly packaged to provide protection against transportation damage.
B. Handling: Exercise extreme care in unloading, storing and erecting panels to prevent bending, warping, twisting, and surface damage.

C. Storage: Store all material and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation to panels to prevent condensation build-up between each panel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide roof and wall panels by one of the following:
   1. Berridge Manufacturing Company
   2. MBCI Metal Roof and Wall Systems
   3. ColorKlad/ Vincent Metals Building Products Group
   4. Other manufacturers who comply with the specifications herein and when determined by the Owner and Architect to be an equal product may be considered.

B. Basis of Design Manufacturer: MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.; Houston TX. Tel: (877)713-6224; Email: info@mbci.com; Web: www.mbci.com.

C. Products listed for basis of design. Equal products will be accepted.

D. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.2 METAL ROOF PANELS

A. Mechanically-seamed, Concealed Fastener, Metal Roof Panels: Structural metal roof panel consisting of formed metal sheet with vertical ribs at panel edges, installed by lapping and mechanically interlocking edges of adjacent panels, and attaching panels to supports using concealed clips and fasteners in a weathertight installation.
   1. Basis of Design: MBCI, SuperLok, www.mbci.com/superlok.html.
   2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A 755/A 755M.
   3. Panel Width: [12 inches (305 mm)] .
   4. Panel Seam Height: 2 inch (50.8 mm).
   5. Joint Type: Mechanically seamed.

2.3 METAL ROOF PANEL ACCESSORIES

A. General: Provide complete metal roof panel assembly incorporating trim, copings, fascia, gutters and downspouts, and miscellaneous flashings, in manufacturer's standard profiles. Provide required fasteners, closure strips, thermal spacers, splice plates, support plates, and sealants as indicated in manufacturer's written instructions.

B. Eave and Fascia Trim: Pre-finished metal to match roofing panels in gauge and finish color. Fabricate of size and shapes as detailed on the drawings.

C. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.

D. Panel Clips: Provide panel clip of type specified, at spacing indicated on approved shop drawings.
   1. Two-piece Floating: ASTM C 645, with ASTM A 653/A 653M, G90 hot-dip galvanized zinc coating, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.

2. Single-Piece Fixed: ASTM C 645, with ASTM A 653/A 653M, G90 hot-dip galvanized zinc coating, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.

E. Panel Fasteners: Self-tapping screws and other acceptable fasteners recommended by roof panel manufacturer. Where exposed fasteners cannot be avoided, supply long life fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.

F. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
1. Factory-Applied Seam Sealant: Manufacturer's standard hot-melt type.
2. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
3. Concealed Joint Sealant: Non-curing butyl, AAMA 809.2.

G. Closures: Provide all required miscellaneous fabrications and closures as indicated by the Contract Documents. Match gage and finish of adjacent work.

H. Roof Jacks: Openings 10 inches in diameter or smaller may be flashed and sealed to the roof panel by jacks.
1. Material: EPDM with an aluminum sealing ring base.
2. Jacks are acceptable providing attachment in the flat of the roof panel with no standing seam rib altered in any way. If a rib must be altered, a roof curb shall be employed.
3. Install roof jacks per manufacturer's instructions.

I. Ridge Cap: Manufacturer's standard ridge cap assembly. Match finish of roofing panels.

J. Steel Sheet Miscellaneous Framing Components: ASTM C 645, with ASTM A 653/A 653M, G60 hot-dip galvanized zinc coating.

K. Slip sheet: See Specification Section 07600.

2.4 GUTTERS AND DOWNSPOUTS

A. 24 GA pre-finished metal to match roofing panels. Fabricate of size and shapes as detailed on the drawings. Provide expansion joints as shown on the drawings and not to exceed 36'-0" for all gutters.

B. Downspout & gutters shall be shop fabricated from flat sheet material with 90 degree corners, conforming to SMACNA - "Architectural Sheet Metal Manual."

2.5 FABRICATION

A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Fabricate metal panel joints configured to accept factory-applied sealant providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.

C. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved shop drawings.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

E. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual," and other recognized industry practices. Fabricate for waterproof and weather resistant performance, with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material.

Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to lines and levels indicated, with all exposed edges folded back to form hems.

2.6 FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
B. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
C. Interior Finish: 0.5 mil total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.
D. Durability: Provide coating that has been field tested under normal range of weathering conditions for a minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 in accordance with ASTM D 659; and without fading in excess of NBS units.
E. Color to be selected by Architect from the manufacturer's full range of available colors (including premium colors).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
   1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
   2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
      a. 1/4 inch (6 mm) in 20 foot (6.1 m) in any direction.
      b. 3/8 inch (9 mm) over any single roof plane.
B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal roof panel system installation.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C 754 and manufacturer's written instructions.
B. Flashings: Install flashings to cover exposed underlayment per Section 07 62 00 "Sheet Metal Flashing and Trim."

3.3 METAL PANEL INSTALLATION

A. Mechanically-Seamed, Standing Seam Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Attach panels to supports using clips, screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.
   1. Fasten metal panels to supports with concealed clips at each location indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
   2. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
   3. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
   4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Field-cutting by torch is NOT permitted.

3.4 ACCESSORY INSTALLATION

A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
   2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
   3. Provide concealed fasteners except where noted on approved shop drawings.
   4. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.
   1. Provide weatherseal under ridge cap. Flash and seal roof panels at eave and make with rubber, neoprene, or other closures to exclude weather.
   2. Refer to other sections of these specifications for product and installation requirements applicable to indicated joint sealers.
   3. Apply a continuous ribbon of sealant tape to clean, dry surface of the weather side of fastenings on end laps, and on side laps of corrugated nesting-type, ribbed, or fluted panels and elsewhere as needed to make roof sheets weatherproof to driving rains.

3.5 CLEANING AND PROTECTION

A. Damaged Units: Replace panels and other components of the work that have been damaged, incorrectly installed, not installed as indicated in the drawings or specifications or otherwise rejected by the Architect for surface and/or workmanship defects.

B. Cleaning: Remove temporary protective coverings and strippable films as soon as each panel is installed. Upon completion of panel installation, clean finished surfaces as recommended by the panel manufacturer, and maintain a clean condition during construction.

END OF SECTION

SECTION 07 42 13.13

FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concealed-fastener metal wall panels.
   2. Open joint, rainscreen installation.
   3. Sealed joint, weathertight installation.

B. Related Sections:
   1. Section 07 42 13.19 "Insulated Metal Wall Panels" for foamed-in-place, laminated and honeycomb insulated metal wall panels.
   2. Section 07 42 13.23 "Metal Composite Material Wall Panels" for metal-faced composite wall panels.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
1. Include Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

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

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

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

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical metal panel assembly, including corner, supports, attachments, and accessories.
2. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.8 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

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

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 1.57 lbf/sq. ft..

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 CONCEALED-FASTENER METAL WALL PANEL

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching with concealed fastener to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

B. Inverted Plank Profile, vertical Concealed-Fastener Metal Wall Panels.
   1. Basis-of-Design Product: (Must match existing Pearl Parks and Rec Baseball/Softball Concession Stand) Subject to compliance with requirements, provide McElroy Metal Inverted Plank Profile Concealed Fastener Panel or equal product.
   2. Panels to be Kynar coated galvanized steel as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
      a. Thickness: 22 ga.
      b. Surface: Smooth, flat finish.
      c. Exterior Finish: Three Coat Metallic fluoropolymer System (Kynar coated).
      d. Color: must match existing Pearl Parks and Rec Baseball/Softball concession stands (Grey color)
   3. Panel Coverage: 12 inches.
   4. Panel depth: 1.5 inch.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Extruded Trim: Manufacturer's complementary aluminum extrusions for head, jamb, sill, base, flush, reveal, inside and outside corner, endwalls and expansion joint details. Finish to match metal wall panels.
1. Basis of Design: CENTRIA, Microline Extrusions

E. Mitered Corners: Structurally-bonded horizontal interior and exterior trimless corners matching metal wall panel material, profile and factory-applied finish, fabricated and finished by metal wall panel manufacturer
1. Welded, riveted, fastened or field-fabricated corners do not meet the requirements of this specification.
2. Basis of Design: CENTRIA, Microseam Corners.

F. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

G. Concealed Clips: Galvanized steel, 0.051 inch/16 ga. thick, designed to allow unimpeded thermal movement of panel and configured to hold panel minimum ½" inch from substrate.

H. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Coated Galvanized Steel Panels and Accessories:
   1. Metallic Fluoropolymer: AAMA 2605. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
    a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

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

B. Fasteners:
1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.

4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:
1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 46 20
FIBER-CEMENT SIDING, PANELS, AND TRIM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Suplementary Conditions and Division 1 specification sections, apply to the work of this section.

1.2 SECTION INCLUDES

A. Fiber cement lap siding, panels, single, trim, fascia, moulding and accessories engineered for climate.

1.3 RELATED SECTIONS

A. Section 06100 - Rough Carpentry
B. Section 07120 - Weather Barrier
C. Section 07210 - Insulation
D. Section 07600 - Flashing and Sheet Metal
E. Section 07900 - Caulking and Sealants

1.4 REFERENCES

A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
B. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
E. Verification Samples: For each finish product specified, two samples, minimum size 2’-0” long by full molding width, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship. Mock-up may be included as part of finished work with approval by Architect.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Product Warranty: Limited, non-pro-rated product warranty.
   1. 30 years for siding, lap siding, vertical siding and panels.
   2. 15 years for boards.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN

A. Basis of Design: All products listed are manufactured by James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: request info (info@jameshardie.com); Web: www.jameshardiecommercial.com
B. Products listed for basis of design. Equal products will be accepted.
C. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.
D. Fiber-cement siding, vertical siding, panels and shingle siding material shall comply with ÅSTM C 1186 Type A Grade II, ÅSTM E 136 as a noncombustible material, ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

2.2 MATERIALS

A. Soffit Panels: HardieSoffit soffit panel, factory sealed on 5 sides as manufactured by James Hardie Building Products, Inc.
   1. Type: Smooth non-vented in perimeter soffit as indicated on drawings. Soffit vents to be installed per plans.
   2. Type: Bead board on underside of canopy all sides as indicated on drawings

B. Trim:
   1. HardieTrim HZ10 boards as manufactured by James Hardie Building Products, Inc.
      a. Product: 4/4 Boards, 3-1/2 inch (89 mm) width
      b. Product: 5/4 Boards, 3-1/2 inch (89 mm) width.
      c. Product: 4/4 Boards, 5-1/2 inch (140 mm) width.
      d. Product: 5/4 Boards, 5-1/2 inch (140 mm) width.
      e. Product: 5/4 Boards, 7-1/4 inch (184 mm) width.
      f. Product: 5/4 Boards, 9-1/4 inch (235 mm) width.
      g. Product: 5/4 Boards, 11-1/4 inch (286 mm) width.
      h. Texture: Smooth.
      i. Length: 12 feet (3658 mm).
      j. Thickness: 1 inch (24 mm).
   2. HardieTrim HZ10 Fascia boards as manufactured by James Hardie Building Products, Inc.

2.3 FASTENERS

A. Wood Framing Fasteners: corrosion resistant nails. Diameter and length sized to meet manufacturers' recommendation for application.
B. Screen wall requires trusshead screws.
C. Metal Framing: No. 8-18 head self-drilling, corrosion resistant S-12 ribbed buglehead screws. Diameter and length sized to meet manufacturers' recommendation for application.
D. Masonry Walls: Aerico Stud Nail, ET&F ASM No.-144-125, 0.14 inch (3.6 mm) shank by 0.30 inch (7.6 mm) head by 2 inches (51 mm) long corrosion resistant nails.

2.4 FINISHES

A. Factory Primer: Provide factory applied universal primer for field painting. Refer to Section 09900 and Exterior Finish Schedule for top coat selections.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
   1. Framing and sheathing faces is to be straight, true of uniform dimensions and properly aligned.
   2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
B. If framing and water-resistive barrier preparations are the responsibility of other installers, notify General Contractor and Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Install a water-resistive barrier as required and specified.

3.3 GENERAL INSTALLATION

A. Install materials in strict accordance with manufacturer's installation instructions.
B. Install level, plumb, true and straight. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) for level and plumb.
C. Scribe and cut siding and trim to fit adjoining work. Seal cut surfaces and repair damaged finish at cuts.
D. Install trim with minimum number of joints possible using full-length pieces to the greatest extent possible. Stagger joints in adjacent and related members.

3.4 INSTALLATION - TRIM BOARDS

A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.
B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
C. Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.
D. Maintain clearance between trim and adjacent finished grade.
E. Trim inside corner with a single board trim both side of corner.
F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.
G. Allow 1/8 inch gap between trim and siding.
H. Seal gap with high quality, paint-able caulk.
I. Shim frieze board as required to align with corner trim..
J. Fasten through overlapping boards. Do not nail between lap joints.
K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten trim boards to trim boards.
L. Shim frieze board as required to align with corner trim.
M. Install HardieTrim Fascia boards to rafter tails or to sub fascia.

3.5 PROTECTION

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

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manufactured through-wall flashing with counterflashing.
   2. Formed roof-drainage sheet metal fabrications.
   3. Formed low-slope roof sheet metal fabrications.
   4. Formed equipment support flashing.

B. Related Requirements:
   1. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Section 07 95 00 "Expansion Control" for manufactured sheet metal expansion-joint covers.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
   3. Review requirements for insurance and certificates if applicable.
   4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.
   1. Include plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
   3. Include identification of material, thickness, weight, and finish for each item and location in Project.
   4. Include details for forming, including profiles, shapes, seams, and dimensions.

5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.
1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.

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

D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
1. For copings and roof edge flashings that are SPRI ES-1 tested [and] [FM Approvals approved], shop shall be listed as able to fabricate required details as tested and approved.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
1. Build mockup of typical roof edge, including fascia, approximately 10 feet long, including supporting construction cleats, seams, attachments and accessories.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
4. Mockup may remain as part of the work if approved by the architect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. FM Approvals Listing: Manufacture and install [copings] [roof edge flashings] that are listed in FM Approvals' "RoofNav" and approved for windstorm classification indicated on drawings. Identify materials with name of fabricator and design approved by FM Approvals.

D. SPRI Wind Design Standard: Manufacture and install copings[roof edge flashings] tested according to SPRI ES-1 and capable of resisting the following design pressure:
1. Design Pressure: As indicated on Drawings.

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

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

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
   1. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
   2. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Color: As selected by Architect from manufacturer's full range.
   4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft.minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
   1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
      a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
      b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
      c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
   2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
   1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   2. Obtain field measurements for accurate fit before shop fabrication.
   3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
   4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
   1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
   2. Use lapped expansion joints only where indicated on Drawings.

E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard[and by FM Global Property Loss Prevention Data Sheet 1-49] for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

J. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

K. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
   1. Gutter Profile: [Style A] [Style F] according to cited sheet metal standard.
   2. Expansion Joints: Lap type].
   3. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen.
   4. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
      a. Aluminum: [0.032 inch] thick.
   5. Gutters with Girth 16 to 20 Inches: Fabricate from the following materials:
      a. Aluminum: [0.040 inch] thick.
   6. Gutters with Girth 21 to 25 Inches: Fabricate from the following materials:
      a. Aluminum: [0.050 inch] thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.
   1. Fabricated Hanger Style: [Fig 1-35A] [Fig 1-35B] [Fig 1-35C] [Fig 1-35D] [Fig 1-35E] [Fig 1-35F] [Fig 1-35G] [Fig 1-35H] [Fig 1-35I] [Fig 1-35J] according to SMACNA's "Architectural Sheet Metal Manual."
   2. Fabricate from the following materials:
      a. Aluminum: [0.024 inch] thick.

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof.[Fasten gravel guard angles to base of scupper.] Fabricate from the following materials:
   1. Aluminum: [0.032 inch] thick.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes[, exterior flange trim,] [and] [built-in overflows]. Fabricate from the following materials:
   1. Aluminum: [0.032 inch] thick.

E. Splash Pans: Fabricate to dimensions and shape required and from the following materials:
   1. Aluminum: [0.040 inch] thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates.
   1. Joint Style: Overlapped, 4 inches wide .
   2. Fabricate with scuppers spaced 10 feet apart, to dimensions required with 4-inch-wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
   3. Fabricate from the Following Materials:
      a. Aluminum: 0.050 inch thick.

B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support

edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight.

1. Coping Profile: Fig 3-4A according to SMACNA's "Architectural Sheet Metal Manual."
2. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
3. Fabricate from the Following Materials:
    a. Aluminum: 0.050 inch thick.

C. Base Flashing: [Shop fabricate interior and exterior corners.]Fabricate from the following materials:

1. Aluminum: 0.040 inch thick.

D. Counterflashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.

E. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.

F. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

G. Roof-Drain Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams. Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.

C. Wall Expansion-Joint Cover: Fabricate from the following materials:

1. Aluminum: 0.040 inch thick.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Galvanized Steel: [0.028 inch] thick.

B. Overhead-Piping Safety Pans: Fabricate from the following materials:

1. Galvanized Steel: [0.040 inch] thick.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify compliance with requirements for installation tolerances of substrates.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder [metallic-coated steel] [and] [aluminum] sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters: Join sections with [joints sealed with sealant]. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
1. Fasten gutter spacers to front and back of gutter.
2. Anchor and loosely lock back edge of gutter to continuous [cleat] [eave or apron flashing].
3. Anchor gutter with [gutter brackets] spaced not more than [24 inches] apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
4. Install gutter with expansion joints at locations indicated, but not exceeding, [50 feet] apart. Install expansion-joint caps.
5. Install continuous gutter screens on gutters with noncorrosive fasteners, [hinged to swing open] for cleaning gutters.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
2. Provide elbows at base of downspout to direct water away from building.
3. Connect downspouts to underground drainage system.

D. Splash Pans: Install where downspouts discharge on [low-slope roofs]. Set in elastomeric sealant compatible with the substrate.

E. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
1. Anchor scupper closure trim flange to exterior wall and [seal with elastomeric sealant] to scupper.
2. Loosely lock front edge of scupper with conductor head.
3. [seal with elastomeric sealant] exterior wall scupper flanges into back of conductor head.

F. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below [scupper] [or] [gutter] discharge.

G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

D. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at [24-inch] [16-inch] centers.
2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at [24-inch] centers.

E. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

F. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of [snap-in installation and sealant or lead wedges and sealant] [interlocking folded seam or blind rivets and sealant] [anchor and washer at 36-inch centers] unless otherwise indicated.

G. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 04 20 00 "Unit Masonry."

C. Opening Flashings in Frame Construction: Install continuous head, sill,[jamb,] and similar flashings to extend [4 inches] beyond wall openings.

3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.9 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 07 90 00

CAULKING AND SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 specification sections apply to work of this section.

1.2 DESCRIPTION OF WORK

A. This section includes caulking, sealing, pointing and other related items necessary to complete the work as indicated in the Contract Documents.

1.3 RELATED WORK OF OTHER SECTIONS

1. Sealing, caulking and pointing specified in other sections shall conform to all requirements of this Specification Section.

1.4 STORAGE AND HANDLING

A. Store and handle materials so as to prevent the inclusion of foreign matter or the damage of materials by water or breakage. Store materials in original containers until ready for use. Materials showing evidence of damage shall be rejected and not installed.

1.5 SUBMITTALS

A. Submit manufacturer’s product data and specifications indicating conformance with the project requirements.
B. Submit cured sample color options (full range of available colors) for each type of material specified.

PART 2 - PRODUCTS

2.1 PRIMER

A. Primer shall be a compound designated to insure adhesion of the sealant, selected for compatibility with sealant and adjacent surfaces. Primer shall be supplied by the sealant manufacturer.

2.2 BACKER RODS

A. Backer rods shall be closed-cell polyethylene foam of highly flexible and compressible characteristics, intended for use with cold-applied sealant materials.

2.3 CAULKING

A. Caulking shall be a Dymeric Multi-component epoxidized polyurethane, Class A conforming to ASTM C920-79 with primer as manufactured by Tremco or Architect's approved equal.

2.4 BUILDING SEALANT

A. Building Sealant shall be a one-part, high-performance polyurethane sealant. Building Sealant shall be "NP1" as manufactured by Sonneborn or Architect's approved equal.

B. Equal products by the following manufacturers shall be acceptable:

1. Pecora
2. Tremco

2.5 PAVING JOINT SEALANT

C. Paving Joint Sealant shall be a one-part, self-leveling polyurethane, Type S, Grade P, Class 25 conforming to ASTM C-920. Building Sealant shall be "Sonnolastic SL1" as manufactured by Sonneborn or Architect's approved equal.

D. Additional acceptable Building Sealants are as follows:

1. NR-201 UREXPAN as manufactured by Pecora
2. Tremflex S/L as manufactured by Tremco.

E. Color for each condition shall be as selected by Architect.

PART 3 - EXECUTION

3.1 JOINT CLEANING

A. Thoroughly clean all joints. Material to be contacted by caulking and sealants shall be dry, fully-cured, free of laitance, loose aggregate, form release agents, curing compounds, water repellants and other surface treatments.

3.2 JOINT PACKING

A. Install joint packing in all joints to receive sealant which exceed 1/4 inch in depth. Packing shall be sized to require 20% to 50% compression upon insertion and shall be placed so the sealant depth complies with the manufacturer's recommendations. Avoid lengthwise stretching of packing materials.

3.3 MASKING

A. Apply masking tape where required to protect adjacent surfaces. Adhere tape in continuous strips in alignment with joint edge and remove immediately after joint has been sealed and tooled.

3.4 JOINT PRIMING

A. Prime joints to receive sealant in accordance with manufacturer's recommendations. Brush primer uniformly upon all surfaces of joint and allow sufficient drying time before proceeding with installation of sealant.

3.5 APPLICATION

A. Apply caulking and sealants material under pressure to fill joints completely or as specified, with prevention of air pockets or voids. Tooling, where required, shall be performed with solvent as recommended by the manufacturer. Joints shall be tooled slightly concave an all excess material removed.

3.6 LOCATION OF SEALANT

A. Sealant shall be applied around penetrations at floor slabs, at exterior walls, around the exterior perimeter of door and window frames, louvers, vents and other locations as indicated on the drawings.

B. Install sealant in all "wet" or "damp" interior areas such as interior corners of ceramic tile walls and joints between tile work and plumbing fixtures and other materials.

C. Set all exterior thresholds in a bed of sealant.

D. Exterior concrete paving and concrete sidewalk expansion joints.

E. Do not paint over sealant.

3.7 LOCATION OF CAULKING

A. Install caulking at all interior locations as indicated on the drawings as required for a complete and proper job, except those specified to receive sealant.

B. Install caulking at the edges where millwork counter tops and backsplashes abut wall construction.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow-metal work.

B. Related Requirements:
   1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 COORDINATION

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

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
   8. Details of moldings, removable stops, and glazing.
   9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

   Heavy-Duty Doors and Frames: SDI A250.8, Level 3. At interior locations, unless otherwise indicated.
   1. Physical Performance: Level A according to SDI A250.4.
   2. Doors:
      a. Type: As indicated in the Door and Frame Schedule.
      b. Thickness: 1-3/4 inches.
      c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.053 inch.

d. Edge Construction: Model 2, Seamless.
e. Core: Vertical steel stiffener.

3. Frames:
   a. Materials: Metallic-coated, steel sheet, minimum thickness of 0.053 inch.
   b. Construction: Full profile welded.
4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4.
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches
   c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
   d. Edge Construction: Model 2, Seamless.
   e. Core: Manufacturer's standard polyurethane, polyisocyanurate, or mineral-board core at manufacturer's discretion with steel stiffners.
      1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
3. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum G60 coating.
   b. Construction: Full profile welded.
   c. Thermal properties: Minimum of 0.41 U value (2.4 R value) according to NFRC 102-2014 and ASTM.
      1) Provide thermal barrier anchor applications.
4. Exposed Finish: Prime.
5. Provide ADA compliant two part thresholds and continuous weather stripping at all exterior doors.

2.5 FRAME ANCHORS

A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
4. Post-installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 MATERIALS

A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

B. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

E. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

H. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:
   1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
   2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
   3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
   4. Top Edge Closures: Close top edges of doors with inverted or flush closures, except provide flush closures at exterior doors, of same material as face sheets.
   5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.

6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor.
5. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
        1) Three anchors per jamb up to 90 inches high.
        2) Four anchors per jamb from 90 to 120 inches high.
        3) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Four anchors per jamb up to 90 inches high.
        2) Five anchors per jamb from 90 to 96 inches high.
        3) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, templates, and the following:
1. Reinforcement:
    a. Hinge Reinforcement: Metallic-coated steel sheet, minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
    b. Other Surface-Mounted Hardware, Lock Face, Flush Bolts, Closers, and Concealed Holders: Metallic-coated steel sheet, minimum 0.067 inch thick.

2. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
3. Provide welded continuous 12 gauge straps in doors and frames for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
4. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 ACCESSORIES

A. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
   1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
      a. At fire-rated openings, install frames according to NFPA 80.
      b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
      c. Install frames with removable stops located on secure side of opening.
      d. Install door silencers in frames before grouting.
      e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
      f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
      g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
      a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
   3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
      a. Provide at walls with STC ratings over 52.
   4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
   5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
   6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
   7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
   8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
      a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
      b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
      c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
      d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Steel Doors:
      a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.

c. At Bottom of Door (No Threshold): 3/4 inch plus or minus 1/32 inch.
d. Between Bottom of Door And Threshold: 3/8 inch plus or minus 1/32 inch.
e. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION

SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Service doors.
   2. Insulated service doors.
   3. Fire-rated service doors.

B. Related Requirements:
   1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports.
   2. Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting" for finish painting of factory-primed doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.
   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
   3. Include description of automatic closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include plans, elevations, sections, and mounting details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
   5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
   6. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
   1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
   1. Curtain slats.Bottom bar with sensor edge.
   2. Guides.
   3. Brackets.
   4. Hood.
   5. Locking device(s).
   6. Include similar Samples of accessories involving color selection.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Oversize Construction Certification: For door assemblies required to be fire-rated and that exceed size limitations of labeled assemblies.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
   1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
   1. Temperature-Rise Limit: At exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

C. Regulatory Requirements: Comply with applicable provisions in Canadian Standards Association (CSA Standards) B651-12 (or equal to ANSI A117.1).

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
   1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
   1. Design Wind Load: As indicated on Drawings.
   2. Testing: According to ASTM E 330 or DASMA 108 for garage doors and meeting the acceptance criteria of DASMA 108.
   3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
   4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

B. Windborne-Debris Impact Resistance: Provide impact-protective exterior overhead coiling doors that pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 4.
   1. Large-Missile Test: For overhead coiling doors located within 30 feet of grade.
   2. Small-Missile Test: For overhead coiling doors located more than 30 feet above grade.

C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Component Importance Factor: As indicated on the Drawings.

2.3 DOOR ASSEMBLY

A. Service and Insulated Service Doors: Overhead coiling door formed with curtain of interlocking metal slats.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. C.H.I. Overhead Doors, Inc.
      b. Clopay Building Products.
      c. Cookson Company.
      d. Cornell Iron Works, Inc.
      e. McKeon Rolling Steel Door Company, Inc.
      f. Overhead Door Corporation.
      g. Raynor.
      h. Mississippi Door Company

B. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
   1. Include tamperproof cycle counter.

C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283.

D. STC Rating: 26.

E. Curtain R-Value: 4.5 deg F x h x sq. ft./Btu.

F. Door Curtain Material: Steel

G. Door Curtain Slats: Curved profile slats of 1-7/8-inch center-to-center height.
   1. Slat Interior Facing: Steel
   2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

H. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.

I. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

J. Hood: Match curtain material and finish.
   1. Shape: As shown on Drawings.
   2. Mounting: As shown on Drawings

K. Locking Devices: Equip door with locking device assembly.
   1. Locking Device Assembly: both jambs side locking bars, operable from inside with thumb turn.

L. Curtain Accessories: Equip door with push/pull handles and automatic closing device.

M. Door Finish:
   1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
   2. Factory Prime Finish: Manufacturer's standard color.
   3. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 FIRE-RATED DOOR ASSEMBLY

A. N/A

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Steel Door Curtain Slats: cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, nominal sheet thickness (coated) of 0.028 inch; and as required.
   2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
   1. Steel: Nominal 0.028-inch-thick, complying with ASTM A 653/A 653M.

2.7 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

2.8 CURTAIN ACCESSORIES

A. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.9 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 GENERAL FINISH REQUIREMENTS

F. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

G. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STEEL AND GALVANIZED-STEEL FINISHES

A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Fire-Rated Doors: Install according to NFPA 80.

E. Power-Operated Doors: Install automatic doors openers according to UL 325.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Perform installation and startup checks according to manufacturer's written instructions.
   2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
   3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
   1. Adjust exterior doors and components to be weather-resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
   1. Perform maintenance, including emergency callback service, during normal working hours.
   2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

B. END OF SECTION

SECTION 08 54 00
COMPOSITE DOORS AND WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum-clad wood windows.

1.2 RELATED SECTIONS

A. Section 07100 – Waterproofing
B. Section 07600 – Flashing and Sheet Metal
C. Section 07900 – Caulking and Sealants

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA):
   1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.
   2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. American Society for Testing and Materials (ASTM):
   1. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
   2. ASTM C 1036 - Flat Glass.
   3. ASTM C 1048 - Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass.
   4. ASTM D 1149 - Rubber Deterioration – Surface Ozone Cracking in a Chamber.
   5. ASTM D 2803 - Filiform Corrosion Resistance of Organic Coatings on Metal.
   6. ASTM D 4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser.
   7. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
   8. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
   9. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
   10. ASTM G 85 - Modified Salt Spray (Fog) Testing.

C. Window and Door Manufacturers Association (WDMA):
   1. ANSI/AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
   2. ANSI/AAMA/NWWDA 101/I.S.2/NAFS-02 - Voluntary Performance Specification for Windows, Skylights and Glass Doors.
   3. WDMA I.S.4 - Industry Standard for Water-Repellent Preservative Non-Pressure Treatment for Millwork.

1.4 PERFORMANCE REQUIREMENTS

A. Window Unit Air Leakage, ASTM E 283, 6.24 psf (50 mph): 0.05 cfm per square foot of frame or less.

B. Window Unit Water Penetration: No water penetration through window unit when tested in accordance with ASTM E 547, under static pressure of 15 psf (77 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.5 SUBMITTALS

A. Comply with requirements of Section 01330.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.

D. Samples: Submit full-size or partial full-size sample of window illustrating glazing system, quality of construction, and color of finish.

E. Warranty: Submit manufacturer’s standard warranty.

1.6 QUALITY ASSURANCE

A. Mockup:
1. Provide sample installation for field testing window performance requirements and to determine acceptability of window installation methods.
2. Approved mockup shall represent minimum quality required for the Work.
3. Incorporate (1) window assembly into the Coordinated Building Envelope Mock-up.
4. Approved mockup(s) shall remain in place until completion of the project.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.

B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.

C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Jeld-Wen Windows and Doors Corporation. Website https://www.jeld-wen.com/en-us

2.2 ALUMINUM-CLAD WOOD WINDOWS

A. Manufacturer's Premium Series.

B. Frame (Sill):
   1. Select woods, water-repellent, preservative-treated with water-repellency, active fungicides and an insecticide applied to the frame.
   2. Interior Exposed Surfaces: Clear Pine with no visible fastener holes.
   3. Exterior Surfaces: Clad with aluminum.
   4. Sill Assembly: Mitered at ends where joined to curved head member.
   5. Overall Frame Depth: 5 inches (127 mm).

C. Frame (Head Member):
   1. Select woods, water-repellent, preservative-treated with water-repellency, active fungicides and an insecticide applied to the frame.
   2. Solid-wood-core blocks bonded with water-resistant glue to stabilized cellulose fiber.
   3. Two sheets laminated with veneers at interior.
   4. Interior Exposed Surfaces: Clear Pine with no visible fastener holes.
   5. Exterior Surfaces: Clad with aluminum.
   6. Head Assembly: Mitered at ends where joined to sill, screwed and sealed.
   7. Overall Frame Depth: 5 inches (127 mm).

2.3 GLAZING

A. Glazing:
   1. Float Glass: ASTM C 1036, Quality 1.
      a. Tempered Glass: ASTM C 1048.

   2. Type: Urethane-glazed, 5/8-inch, dual-seal, tempered insulating glass multi-layer Low-E coated.

   3. Simulated-Divided-Light Glazing and Grilles:
      a. Room Side Grilles: Solid 7/8-inch wide clear pine, water-repellent, preservative-treated in accordance with WDMA I.S.4.
      b. Exterior Grilles: 7/8-inch wide extruded aluminum.
      c. Adhere bars to both sides of insulating glass with VHB acrylic adhesive tape.
      d. Finish: Finish color matches interior and exterior finish colors.

2.4 TOLERANCES

A. Windows shall accommodate the following opening tolerances:
   1. Vertical Dimensions Between High and Low Points: Plus 1/4 inch, minus 0 inch.
   2. Width Dimensions: Plus 1/4 inch, minus 0 inch.
   3. Building Columns or Masonry Openings: Plus or minus 1/4 inch from plumb.

2.6 FINISH

A. Exterior Finish System:
   1. Exterior aluminum surfaces shall be finished with the following multi-stage system:

a. Clean and etch aluminum surface of oxides.
b. Pre-treat with chrome phosphate conversion coating.
c. Pre-treat with chromic acid sealer/rinse.
d. Top coat with baked-on polyester enamel.

2. Color: to be selected by Architect from Manufacturer's full line of available colors.

3. Performance Requirements: Exterior aluminum finishes shall meet or exceed the following performance requirements of AAMA 2605:
   a. Dry Film Hardness: Eagle Turquoise Pencil, F minimum.
   b. Film Adhesion: 1/16-inch crosshatch, dry, wet, boiling water.
   c. Impact Resistance: 1/10-inch distortion, no film removal.
   d. Abrasion Resistance: Falling sand coefficient value of 20 minimum.
   e. Chemical Resistance: 10 percent Muriatic acid, 15 minutes. Mortar pat test, 24 hours.
   f. Detergent Resistance: 3 percent at 100 degrees F, 72 hours.
   g. Corrosion Resistance: Humidity, 3,000 hours. Salt spray exceeds 3,000 hours.

B. Interior Finish: Unfinished, ready for site finishing.

2.7 INSTALLATION ACCESSORIES

A. Flashing/Sealant Tape:
1. Aluminum-foil-backed butyl window and door flashing tape.
2. Maximum Total Thickness: 0.013 inch.
3. UV resistant.
4. Verify sealant compatibility with sealant manufacturer.

B. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.

D. Exterior Perimeter Sealant: high quality, multi-purpose sealant as specified in the joints sealant section.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's instructions and approved shop drawings.

B. Install windows to be weather-tight.

C. Maintain alignment with adjacent work.

D. Secure assembly to framed openings, plumb and square, without distortion.

E. Integrate window system installation with exterior water-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with water-resistant barrier using watershed principles in accordance with window manufacturer's instructions.

F. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.

G. Seal window to exterior wall cladding with sealant and related backing materials at perimeter of assembly.

3.3 FIELD QUALITY CONTROL

A. Field Testing: Field-test windows in accordance with AAMA 502, Test Method A. Manufacturer’s representative shall be present.

3.4 CLEANING

A. Clean window frames and glass in accordance with Division 1 requirements.

B. Do not use harsh cleaning materials or methods that would damage finish.

C. Remove labels and visible markings.

3.5 PROTECTION

A. Protect installed windows to ensure that, except for normal weathering, windows will be without damage or deterioration at time of substantial completion.

END OF SECTION

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SECTION 08 56 19

PASS THRU WINDOWS

PART 1 - GENERAL

1.1 GENERAL

A. Section Includes:
   1. Operable concession stand pass thru window.

1.2 SUBMITTALS

A. See section 013000 for submittal procedures.

B. Submittal to contain sections, elevations, and details of all conditions.

C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

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

1.4 WARRANTY

A. See Section 017800 – Closeout Submittals, for additional warranty requirement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain windows from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Basis of design manufacturer: Quikserv model with fixed upper transom and operable slide lower windows. See drawings for additional information.
   1. Description:
      a. Service Opening: See drawings
      b. Shipped fully assembled and ready to install
      c. Warranty backed by nationwide service centers.
      d. Units with auto-latch handle lock automatically when closed
      e. Corrosion resistant materails. Anodized aluminum and #304 finish stainless steel
      f. ¼" tempered safety glass
      g. Weather resistant and sealed to protect from the elements.
      h. Color to be selected from manufacturer's full range.
      i. ASTM approved
      j. Right or left hand window slide, see drawings.

2.2 MATERIALS

A. Color and material to be selected by architect from full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Touch up minor abrasions in finishes to be compatible with factory-applied finish coating.

END OF SECTION

SECTION 08 71 00
FINISH HARDWARE

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. The work in this section shall include the furnishing of all items of finish hardware as hereinafter specified, or obviously necessary to complete the building, except those items which are specifically excluded from this section of the specification.

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

1.2 RELATED WORK:

A. The following section of this specification should be examined in order to identify materials or equipment which may be obtained through this section.
1. Section 01210 - Allowances
2. Section 08100 – Metal Doors and Frames

1.3 DESCRIPTION OF WORK:

A. Finish Hardware: Hardware used in building construction but particularly that used on or in connection with doors, frames, cabinets and other movable members. It also has a finished appearance as well as functional purpose and may be considered as a part of the decorative treatment of a room or building.

1.4 QUALITY ASSURANCE:

A. Hardware has been specified herein by manufacturers' name, brand and catalog numbers for the purpose of establishing a basis for quality, finish, design and operational function. No other products will be furnished unless approved by means of 1.4 Paragraph "D".

B. To insure a uniform basis of acceptable materials, it is the intention that only manufacturers' item specified as "acceptable and approved" be furnished for use on this project.

C. Deviation from or modification of items will be permitted only for special instances caused by reason of construction characteristics and for the purpose of providing proper operational function. The contractor shall be responsible for checking any necessary deviations in order that hardware shall fit and function properly.

D. Substitutions: Request for substitutions of items of hardware other than those listed as "acceptable and approved" shall be made to the architect in accordance with Section 01630 Product Options and Substitution Procedures. Approval of substitutions will only be given in writing or by Addenda. Requests for substitutions shall be accompanied by samples and/or detailed information for each manufacturer of each product showing design, functions, material thickness and any other pertinent information needed to compare your product with that specified. Substitution requests for mortise locks, door

closers and exit devices shall include a physical sample. Lack of this information will result in a refusal.

E. Supplier: A recognized builders hardware supplier whose principal office and place of business is located within 150 miles of the project site, who has been furnishing hardware in the project's vicinity for a period of not less than five (5) years.

F. Products and installation under the work of this Section shall be in compliance with, in part, at least the more stringent provisions of the following, either the latest edition or latest adopted edition of the locality, and all revisions and amendments thereto:
1. Uniform Federal Accessibility Standards (UFAS).
2. Americans With Disabilities Act of 1990 (ADA) "Accessibility Guidelines" (ADA-AG), and all revisions and amendments thereto.
3. U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA "Accessibility Guidelines" (ADA-AG), Published in the Federal Register July 23, 2004, and revisions and amendments thereto.
4. American National Standards Institute (ANSI), ANSI A 117.1, 2003.
5. International Building Code, as applicable at the project locale.
6. Where this requires any substitution of products specified herein, advise Architect in writing for necessary approvals.

1.5 SUBMITTALS:

A. The finish hardware supplier shall, after award of a formal contract submit to the architect, six (6) complete computerized or typewritten (handwritten are not acceptable) copies of the proposed finish hardware schedule for approval. The schedule shall be prepared using the "sequence and format" for the Door and Hardware Institute (DHI). After approval of the schedule the hardware supplier shall provide three (3) copies of this approved schedule to the contractor for file and distribution purposes. Hardware will not be ordered by the hardware supplier until an approved schedule has been received.

B. When submitting schedules for approval, include two manufacturers' cut sheets on each hardware item proposed. Index it with the use of number or letters or a combination of both, with the hardware schedule. The index numbers/letters are to be in right hand column on the same line as the respective manufacturers' numbers. All manufacturers' numbers shall be indexed even when appearing more than once.

C. Templates: The hardware supplier shall provide necessary templates and/or physical hardware to all trades requiring them in order that they may cut, reinforce or otherwise prepare their material or product to receive the hardware item. If physical hardware is required by any manufacturer the hardware supplier shall ship to them such hardware via prepaid freight in sufficient time to prevent any delay in the execution of their work.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. All items of hardware to be delivered to the job site shall be of completely packaged with all necessary screws, bolts, miscellaneous parts, instructions and where necessary installation templates for manufacturers' suggested installation. All boxes are to have a

typed label with door hand, room location, item number and keying to conveniently identify them and their intended location in the building.

B. A representative of the general contractor shall receive the hardware when delivered at the job site. A dry locked storage space complete with shelving, shall be set aside for the purpose of unpacking, sorting, checking and storage.

C. Items damaged in shipment shall be replaced promptly and with proper material without additional cost to the general contractor.

D. All hardware shall be handled in a manner to minimize marring, scratching or damage.

1.7 WARRANTY:

A. Provide manufacturers warranties from hardware supplier as follows:
1. Closers: Ten years
2. Exit Devices & Locksets: Three years
3. Locksets: Three Years.
4. All other Hardware: One year.

B. The above warranties shall be in addition to, shall be in effect simultaneously with, and shall not alter other project or product warranties or guarantees, nor shall they serve as a limitation to other remedies available to the Owner.

PART 2 - SPECIFIC REQUIREMENTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Allowance: See Section 012100 for Allowances. Hardware Allowance shall be $700 per hardware set.

2.2 FINISH OF HARDWARE:

A. Finish of hardware items shall conform to ANSI A156.18 unless otherwise specified in the hardware sets, and shall be as follows for aluminum, hollow metal and wood doors:

1.	Butts	Exterior 630, Interior 652
2.	Locks and cylinders	626, satin chrome
3.	Closers	689, painted aluminum
4.	Kick, mop, armor plates	630, satin stainless steel
5.	Miscellaneous Items	626 or 630
6.	Continuous Gear Hinges	628
7.	Push & Pulls	630

2.3 HINGES:

A. Templates Hinges: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template hinges which conform to ANSI whenever applicable.

B. Hinge pins, except as otherwise indicated, shall be as follows:
   1. Steel Hinges: Steel Pins
   2. Non-Ferrous Hinges: Stainless Steel Pins
   3. Exterior Doors: Non-Removable Pins (NRP) or Security Stud
   4. Out-Swing Corridor Doors: Non-Removable Pins (NRP), whether specified in the hardware sets or not.
   6. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip indicated.

C. Where projection of door trim is such as to prevent desired degree of opening, the proper hinge width shall be provided to allow the door to clear the trim.

D. Acceptable and approved only as follows:
   1. Hager / Roton
   2. Stanley
   3. Select Products
   4. Bommer

E. Substitutions allowed only as described under paragraph 1.4.D of this section.

2.4 CYLINDERS, KEYS AND KEYING:

A. All lock cylinders shall be Best Access Systems "Premium" series 7-pin key removable core type cylinders as manufactured by Best Access Systems – or Owner's preferred system. All locks, deadlocks and exit devices shall be provided with Best 7-pin key removable cores. Specific keying requirements are to be determined between the owner and Best Access System's designated key system specialist.

B. All lock cylinder housings shall be provided with brass temporary use construction cores for use by the general contractor during construction. The general contractor shall be responsible for removal of brass temporary construction cores. The 08710 Bidder is responsible of the installation of permanent keyed cores at the completion of the project. Permanent cores and keys shall be tested for proper operation at time of installation. Temporary construction use cores shall be returned to the hardware supplier by the general contractor. The general contractor shall reimburse the hardware supplier for brass construction cores not returned

C. Key Quantities:
   10 each construction master keys
   2 each construction control keys
   5 each master keys per MK group created
   2 each operating keys per lock; 8 per keyed alike group
   2 each control keys

D. Provide ONE mortise cylinder wrench for use by the contractor and hardware installer during construction, Best part #ED211.

2.5 LOCKSETS & LATCHSETS:

A. Mortise Locks - Accepted and approved as follows:

1. Exterior Doors - Best 45H series, 14S Design;
2. Note: All levers shall be solid metal. Hollow, plastic filled, plastic lined levers will not be accepted. Rosettes shall be forged or wrought stainless steel, brass or bronze, plated to appropriate finish.

B. Provide function specified in the door hardware sets. All locks shall be equipped with strike dust boxes. Strike size shall be ASA 4 7/8". All locks shall be ANSI grade 1, extra heavy duty and shall be UL listed for fire door use.

C. Substitutions allowed only as described in paragraph 1.4.D of this section.

2.6 CLOSERS:

A. Accepted and approved only as follows:
1. Stanley D3550 Series
2. LCN 1460 Series

B. Substitutions allowed only as described in paragraph 1.4.D of this section.

C. All closers shall be mounted on interior side of rooms.

D. All closers shall have full covers, cast iron or R-14 cast aluminum bodies. All regular arm mounted closers shall have forged steel arms. Parallel arm mounted door closers shall have forged steel arms equal Stanley "EDA". Closers shall be capable of adjustment as required to meet all ADA-AG opening force requirements. Closer case piston diameter shall be minimum 1 ½".

E. All closers shall be U.L. listed and shall meet ANSI grade 1 requirements.

2.7 FLAT GOODS:

A. Accepted and approved only as follows:
1. Trimco
2. Hiawatha
3. Hager

B. It is the responsibility of the hardware supplier to provide proper screw attachments per wall or floor conditions for door stops.

C. Provide stops for each and every interior and exterior opening. Wall stops shall be of cast brass or bronze plated finish to match lock trim finish.

D. Kickplates and armor plates shall be equal to Trimco "K series" and shall be mounted by sheet metal screws where indicated in hardware sets. All kick plates shall be .050" satin stainless steel, beveled all 4 edges, with screw holes drilled. Shape of screw head shall be conical to provide near complete countersink. Pan-head screws or substitution of manufacturer supplied screws will not be acceptable.

E. Substitutions allowed only as described under paragraph 1.4.D of this section.

2.8 THRESHOLDS AND WEATHERSTRIPPING:

A. Accepted and approved as follows:
   1. Zero
   2. National Guard
   3. Reese
   4. Hager

B. Substitutions allowed only as described under paragraph 1.4.D of this section.

2.9 CONTINUOUS GEAR HINGES:

A. Accepted and approved only as follows:
   1. Stanley
   2. Hager Roton
   3. Select Products

B. Substitutions allowed only as described under paragraph 1.4.D of this section.

2.10 EXIT DEVICES AND REMOVABLE MULLIONS:

A. Accepted and approved only as follows:
   1. Precision “Apex” Series
   2. Von Duprin 98 Series

B. Substitutions allowed only as described under paragraph 1.4.D of this section.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Mount hardware units at heights indicated in “recommended locations for builders hardware” for (standard steel doors and frames), (custom steel doors and frames), (wood doors and frames) by the Door and Hardware Institute (DHI), except if otherwise specifically indicated or to comply with requirements of governing regulations, requirements for the disabled or handicapped, or if otherwise directed by the Architect.

B. Degree of opening for doors with overhead holders, closers, etc., shall be included in the hardware schedule for the Architect's approval.

C. All hardware shall be installed by tradesmen skilled in the application of commercial grade hardware.

D. Install each hardware item in compliance with the instructions and recommendations. Securely fasten all parts to be attached. Fit faces of mortised parts snug and flush. Make sure all operating parts move freely and smoothly without binding, sticking or excessive clearance. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted and finished in another way, the hardware shall be removed and stored prior to the painting or finishing. Items shall then be reinstalled only when the finishes have been completed on the surface to which the hardware is to be applied.

E. After installation, representative templates, instruction sheets and installation details shall be placed in a file folder to be turned over to the owner when the building is accepted. Included shall be at least five each of any special adjusting and/or installation tools furnished with the hardware by the manufacturers.

3.2 ADJUSTING AND CLEANING:

A. Adjust and check each operating item of hardware to ensure correct operation and function. Units which cannot be adjusted to operate as intended for the application made shall be replaced.

B. Final Adjustment: Wherever hardware installation is made more than one month prior to building acceptance or occupancy of a space or area. The installer shall return to the work during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items. Hardware shall be cleaned as necessary to restore current operation, function and finish. Door control devices shall be adjusted to compensate for final operation of heating and ventilating equipment.

3.3 PROTECTION:

A. Whenever hardware is located in areas where it may be subject to damage during construction by handling, cleaning, etc., (e.g., painting, cleaning of bricks) it shall be protected and/or removed from its location until the hazardous condition is terminated.

3.4 GENERAL NOTES:

A. Before installation of any hardware begins the contractor's installer shall contact the hardware supplier to discuss any special installation requirements for all hardware items. Their discussion shall include, but not be limited to such items as proper closer mounting, proper fasteners to be used for hardware, locksets and exit device backsets, etc.

B. Electric power tools should be used on hardware fasteners so as to prevent damage to screw heads.

C. Hardware supplier should verify all quantities in the following schedule.

3.5 SCHEDULES:

A. Part 2 Products is a general listing of hardware requirements and is not intended for use as a final hardware schedule. Any items of hardware required by established standards of practice, or to meet state and local codes shall be furnished.

B. Supplier shall recommend hardware for every numbered opening, using the requirements above as part of the Hardware allowance (see section 01210). After review and approval by the Architect and Owner, the supplier shall supply all hardware to be installed by the General Contractor.

C. Supplier is responsible for verification of hardware opening counts by comparison of this schedule of materials to floor plan. Supplier shall supply hardware for every numbered opening.

END OF FINISH HARDWARE

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Condition and other Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

A. The work required in this section consists of all glazing and related items to complete the work as indicated in the Contract Documents.

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Section 08100 - Metal Doors and Frames

1.04 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section.
   1. IGMA Publication for Insulating Glass: SIGMA TM-3000, “Glazing Guidelines for Sealed Insulating Glass Units.”
   2. GANA Publications: “Laminated Glazing Reference Manual”; “Glazing Manual.”
   3. AAMA: “Sloped Glazing Guidelines.”
   4. IGMA: “Guidelines for Sloped Glazing.”

B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.

C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
   1. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.
   2. Where glazing units are specified in Part 2 for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf or less in area, provide glazing products that comply with Category I or II materials.

D. Window Film Applicator Qualifications: Provide documentation that dealer and applicator are authorized by manufacturer of window film to install window films.

1.05 DELIVERY AND STORAGE

A. Deliver glass to site with manufacturer's labels attached to each piece, showing thickness, quality and type. Do not remove labels until material has been approved in place. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes. Store in a safe location until ready for installation.

B. Deliver putty, glazing compound, clips and other glazing items to site in manufacturer's original packages or containers.

1.06 SUBMITTALS

A. Product Data: Submit for each glass product, window film and glazing material indicated.

B. Verification Samples: Submit 12"x12" samples of items specified.

C. Product Certificates: For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

1.07 WARRANTY

A. Window Film Warranty: Warrant materials and workmanship for 12 years against defects after completion and final acceptance of Work. The Contractor shall repair defects from faulty materials or workmanship developed during guarantees period, or replace with new materials, at no expense to Owner. Warranty covers the following:
   1. Film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration.
   2. Glass failure due to thermal shock fracture of glass (maximum value $500.00 per window) provided film is applied to recommended types of glass and failure occurs within 60 months from start of application. Glass failures shall reviewed by film manufacturer prior to replacement.

PART 2 - PRODUCTS

2.01 GLASS PRODUCTS

A. Acceptable Manufacturers:
   1. All glass products shall be manufactured by PPG Industries, Inc., Pilkington Nippon Sheet Glass Co., LTD., Oldcastle BuildingEnvelope, or approved equal.

B. Glazing Schedule: Furnish and install the following type glass where shown on Drawings.

   1. Glazing Type 1: 1" insulated glass, comprised of ¼" clear tempered glass, ½" air space, ¼" clear tempered glass.

2.02 ACCESSORIES

A. Provide all necessary primers, sealant, channels, setting blocks, etc. with items to be glazed.

PART 3 - EXECUTION

3.01 GLAZING INSTALLATION

A. Do not commence glazing work until the required primers have been applied and have dried. Clean all surfaces to which setting materials are to be applied to assure that the materials properly adhere and seal.

B. All glazing shall be performed by experienced glaziers having highest quality workmanship. Glass shall be set without springing or forcing. Putty, glazing compound, stops and the like shall not project above the sight line. Exposed surfaces of putty and glazing compound shall be left straight, flat and clean. Corners shall be well formed.

C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

3.02 CLEANING

A. Glazing: The General Contractor shall be responsible for removal of protective materials and cleaning with plain water, or water with soap or household detergent. The General Contractor shall be held responsible for damages resulting from the use of other cleaning material.

B. Window Film: After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths. After installation, remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.

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SECTION 08 91 19

FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fixed, extruded-aluminum louvers.

B. Related Requirements:
   1. Section 08 11 13 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.
   2. Section 08 14 16 "Flush Wood Doors" for louvers in flush wood doors.
   3. Section 09 91 13 "Exterior Painting" for field painting louvers.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
   1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
   2. Show mullion profiles and locations.

C. Samples: For each type of metal finish required.

D. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

B. Windborne-debris-impact-resistance test reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.6 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Basis of design manufacturer: Greenheck Model ESD-635 or equal.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
   1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

C. Windborne-Debris-Impact Resistance: Louvers located within 30 feet of grade shall pass enhanced protection, large-missile testing requirements in ASTM E 1996 for Wind Zone 2 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than louvers indicated for use on Project.

D. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Component Importance Factor: 1.5

E. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

G. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Drainable-Blade Louver:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Airolite Company, LLC (The).
    b. Construction Specialties, Inc.
    c. Ruskin Company; Tomkins PLC.
2. Louver Depth: 6 inches unless otherwise noted
3. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
4. Mullion Type: Exposed.
5. Louver Performance Ratings:
    a. Free Area: Not less than 8.0 sq. ft. for 48-inch-wide by 48-inch-high louver.
    b. Point of Beginning Water Penetration: Not less than 900 fpm.
    c. Air Performance: Not more than 0.10-inch wg static pressure drop at 750-fpm free-area exhaust and intake velocity.
6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
7. Basis of design manufacturer: Greenheck Model ESD-635

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver
    1. Screen Location for Fixed Louvers: Interior face.
    2. Screening Type: Bird screening.

B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
    1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
    2. Finish: Same finish as louver frames to which louver screens are attached.
    3. Type: Non-rewirable, U-shaped frames.

D. Louver Screening for Aluminum Louvers:
    1. Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire.

2.5 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.
    1. Use Phillips flat-head screws for exposed fasteners unless otherwise indicated.
    2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
    3. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

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

2.6 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
   1. Horizontal Mullions: Provide horizontal mullions at joints.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
   1. Frame Type: Channel unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
   1. Semirecessed Mullions: Where indicated, provide mullions partly recessed behind louver blades so louver blades appear continuous. Where length of louver exceeds fabrication and handling limitations, fabricate with interlocking split mullions and close-fitting blade splices designed to permit expansion and contraction.
   2. Exterior Corners: Prefabricated corner units with mitered and welded blades and with semirecessed mullions at corners.

G. Provide subsills made of same material as louvers or extended sills for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view] unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.7 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
   1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

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SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior abuse-resistant gypsum board.
   2. Interior mold and mildew resistant gypsum board.
   3. Tile backing panels.
   4. Sound Batt Insulation.

B. Related Requirements:
   1. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels, identified on Drawings as “steel studs.”

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations of gypsum board mounted to ceiling framing and control joint pattern. Show widths, details, and locations of expansion and control joints.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Source Limitations: Obtain each type of panel product from single source from single manufacturer.

B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Board: ASTM C 1396/C 1396M, with moisture- and mold-resistant core and paper surfaces.
   1. Product: Subject to compliance with requirements, provide one of the following:
      a. American Gypsum; M-BLOC Type X.
      b. CertainTeed Corp.; ProRoc Moisture and Mold Resistant Type X.
      c. Georgia-Pacific Gypsum LLC; ToughRock Fireguard X Mold-Guard.
      d. National Gypsum Company; Gold Bond Brand XP Fire-Shield.
      e. USG Corporation; Sheetrock Mold Tough Firecode Core.
   2. Core: 5/8 inch, Type X.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM D 3273, score of 10.

B. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, with Level 3 surface abrasion resistance, Level 1 or better indentation resistance, and Level 2 or better soft body impact resistance.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. American Gypsum; M-Bloc AR Type X.
      b. CertainTeed Corp.; AirRenew Extreme Abuse.
      c. National Gypsum Company; Gold Bond Hi-Abuse XP.
   2. Core: 5/8 inch, Type X.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM D 3273, score of 10.

2.4 TILE BACKING PANELS & RESINOUS COVE BASE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1325, with manufacturer's standard edges. Contractor must use cement board in shower rooms behind tile.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. FinPan, Inc; ProTEC Concrete Backer Board.
      b. National Gypsum Company, Permabase Cement Board.
   2. Thickness: 5/8 inch.
   3. Mold Resistance: ASTM D 3273, score of 10.

B. Use cement board at ceilings in wet areas.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      f. Expansion (control) joint.
      g. Curved-Edge Cornerbead: With notched or flexible flanges.
      h. Projection Edge Trim: With extended edge. Basis of Design: Gordon Series 940.
      i. Projection Molding: Thickened extended edge. Basis of Design: Gordon Series 940.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Compound for Interior Gypsum Board:
   1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: For second coat, use setting-type, sandable topping compound.
   4. Finish Coat: For third coat, use setting-type, sandable topping compound.
   5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound, or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

C. Joint Tape and Joint Compound: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Interior Gypsum Board: Open-weave glass mesh, 2” minimum width.
      a. Compound: Ready Mix.
         1) Basis of Design: National Gypsum, Proform Multi-use Joint Compound.
   2. Interior Moisture and Mold Resistant Board: fiberglass mesh, 1.9” minimum width.
      a. Compound: setting type.
   3. Joint Compound for Tile Backing Panels:
      a. Tape: Alkali resistant tape, 2” minimum width.
         1) Basis of Design: National Gypsum, PermaBase Cement Board Tape.
      b. Compound: Thin set mortar.
         1) Basis of Design:
            a) Laticrete 254 Platinum per ASTM A-118.4.
            b) Laticrete 211 and Laticrete 4237 per ASTM A-118.1.

D. Tile Backing Panel Finish Materials for Non-Tiled Applications: For high-humidity and wet non-tiled and painted surfaces, use cement board and comply with tile backing panel manufacturer’s written instructions and filling joints as described above in joint compound..
   1. Base and Skim Coats: Portland cement and polymer adhesive based materials comparable to one of the following, and acceptable to panel manufacturer:

a. Dryvit; Genesis DM, DS174.
b. Sto Corporation; F-477 Flexyl.
c. Parex; ParFlex.
d. Synergy; Xtra-Stop.

2. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. per ASTM E 2098; complying with ASTM D 578 and the following:
   a. Surface Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
   b. Joint and Corner Reinforcing Mesh: 6 inch coated mesh tape.
3. Epoxy Paint Finish: As indicated in the Finish Schedule and Legend and specified in Section 09 91 23 "Interior Painting."

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool. The depth of sound attenuation blanket to match the depth of the metal stud.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. Products: Subject to compliance with requirements, provide one of the following:
   a. Johns Mansville: MinWool or Sound & Fire Block batts.
   b. Knauf: Ecose.
   c. Owens Corning: Sound Attenuation Batts Fiber Glass.

D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
   b. GE Construction Sealants; RCS20 Acoustical.
   c. Grabber Construction Products; Acoustical Sealant GSC.
   d. PABCO Gypsum; Quiet Seal Pro.
   e. Pecora Corporation; AIS-919.
   f. Tremco, Incorporated; Tremco Acoustical Sealant.
   g. USG Corporation; SHEETROCK Acoustical Sealant.
2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Fire rated Joint Sealant: See Division 07.

F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

A. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, including floors. Provide 1/8 - 1/4-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting surfaces with acoustical sealant.

B. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

C. Fire-Rated Assemblies: UL Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of fire rated sealant that matches wall rating. Install sealant at both faces of partitions at perimeters. Refer to Division 07 for firestopping to be used at penetrations.

D. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Moisture- and Mold-Resistant Type: All dry vertical and ceiling surfaces, unless otherwise indicated.
   2. Abuse-Resistant Type: As indicated on Drawings.
   3. Acoustically Enhanced Type: As indicated on Drawings.

B. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
   4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:
   1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
   3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
   4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:
   1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
   2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile in areas subject to direct wetting (e.g. showers, hydrotherapy rooms, steam rooms), as a substrate for wall base at locations indicated to receive resinous flooring with integrally coved wall base, and where indicated.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
   1. Where possible, install vertical control joints at outer edge of door frame.
   2. At ceiling locations, describe on Shop Drawings prior to installation.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners, unless otherwise indicated.
   2. Bullnose Bead: Use where indicated.
   3. LC-Bead: Use where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
   4. L-Bead: Use where edge trim can only be installed after gypsum panels are installed.
   5. U-Bead: Use where indicated.
   6. Curved-Edge Cornerbead: Use at curved openings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
   1. Use elastomeric sealant at door frames in lieu of joint compound.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. At floating ceilings locations, lower wall level finish to extend up past ceiling height by 1.5 times the distance between wall and the edge of the ceiling.

D. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
   1. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   2. Fill Coat: For second coat, use setting-type, sandable topping compound.
   3. Finish Coat: For third coat, use setting-type, sandable topping compound.
   4. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound, or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

E. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile, and where indicated.
3. Level 4: At panel surfaces that will be exposed to view and scheduled to receive wall covering or flat paint finish (MPI Gloss Level 1), unless otherwise indicated.
    a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
    b. Extend wall finish level into coves and reveals.
4. Level 5: At curved partitions, partitions with continuous unbroken length of 20 feet or greater, horizontal and vertical surfaces of soffits, surfaces scheduled to receive paint finish with a sheen of Gloss Level 2 or greater, surfaces scheduled to receive graphic film, and where indicated.
    a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

H. Tile Backing Panel Finish for High-Humidity and Wet Non-Tile Areas:
1. After filling joints with proper joint compound, apply base coat to exposed surfaces of tile backing panel in minimum thickness of 1/16-inch dry-coat thickness.
2. Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2 inches. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.
3. Apply skim coat to completely embed mesh over entire surface and to achieve a fine sand texture.
4. Epoxy Paint Finish: As specified in Section 09 91 23 "Interior Painting."

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 61 13

FLOOR SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes penetrating liquid concrete floor treatment for the following locations:
   1. Areas indicated on the Drawings.
   2. Areas indicated in the Finish Schedule.

B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete" for concrete slabs.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For floor sealers to include in maintenance manuals. Include the following:
   1. Methods for maintaining floor sealers, including cleaning and stain-removal products.
   2. Precautions for cleaning materials and methods that could be detrimental to floor sealers.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Apply floor sealer to set quality standards for materials and execution.
   1. Size: 100 sq. ft. of each type of substrate to demonstrate surface preparation, finish, and standard of workmanship.
      a. The Owner shall be given the opportunity to accept or reject the slip resistance of the sealed concrete prescribed by the Owner’s insurance and legal counsels.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 FLOOR DENSIFIERS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates and seals concrete surfaces.
   1. Prosoco; Consolideck SLX100 or SLX100 less than 350.
   2. Dayton Superior Corporation;
   3. Euclid Chemical Company (The), an RPM company;
   4. Or approved equal

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare floor according to manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

3.2 APPLICATION

A. Apply penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Apply sealer floor treatment according to manufacturer’s written instructions.
   1. Review manufacturer’s written instructions.

END OF SECTION

SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.

B. Related Requirements:
   1. Section 05 12 00 "Structural Steel Framing" for shop priming of metal substrates.
   2. Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.
   3. Section 05 52 13 "Pipe and Tube Railings" for shop priming, painting pipe and tube railings.
   4. Section 09 96 00 "High-Performance Coatings" for tile-like coatings.
   5. Section 09 93 00 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.

1.2 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
   1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. EPA VOC Regulations: All products supplied under this specification section for the locations listed below must be compliant with the VOC limits set in the following districts.
   1. OTC Statutes: Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, New Jersey, Delaware, Maryland, Ohio, Illinois, Virginia: the counties of Arlington, Fairfax, Prince William, Stafford and Loudoun.

B. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
      b. Other Items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2. PPG Paints.
3. Sherwin-Williams.

B. Products: Subject to compliance with requirements, provide one of the products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. Material Compatibility:
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

C. Colors: Colors indicated by manufacturers' designations in the Finish Schedule Legend are basis of design for color-matching other manufactures' paint systems. Architect will supply color selections during construction. Canopy system including columns, CFB board, trim and all associated canopy items to be painted will be painted a dark color.

EXECUTION

2.3 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
2. Masonry (Clay and CMUs): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

2.4 PREPARATION

A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
1. SSPC-SP 6, "Commercial Blast Cleaning."

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Wood Substrates:
1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

H. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

2.5 APPLICATION

A. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed to view:
      a. Equipment, including panelboards and switch gear.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Tanks that do not have factory-applied final finishes.

2.6 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Contractor shall touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

2.7 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

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SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

B. Related Requirements:
   1. Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.
   2. Section 05 52 13 "Pipe and Tube Railings" for shop priming pipe and tube railings.
   3. Section 09 29 00 “Gypsum Board” for painted finishes on non-tiled substrates in wet areas.
   4. Section 09 96 00 "High-Performance Coatings" for tile-like coatings, and for shop priming structural steel.
   5. Section 09 93 00 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.2 DEFINITIONS

A. Gloss Level 1 (Flat): Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2 (Velvet): Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4 (Satin): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5 (Semigloss): 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6 (Gloss): 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7 (High Gloss): More than 85 units at 60 degrees, according to ASTM D 523.

H. Areas Subject to Moisture and Food Preparation: These spaces are those that have permanent plumbing connections and appliances. These include, but are not limited to, toilet rooms connected to shower areas, janitor’s closets, locker rooms connected to shower rooms, shower rooms, steam rooms, training rooms, first aid rooms, concession stands, commissaries, kitchens, and laundries. These areas require epoxy painting systems.
   1. Toilet rooms consisting of toilets and sinks are not included in this definition.
   2. Exam rooms, training rooms and other care giving rooms containing handwashing sinks are not included in this definition unless noted otherwise on the Finish Schedule.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
   a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
   b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. EPA VOC Regulations: All products supplied under this specification section for the locations listed below must be compliant with the VOC limits set in the following districts.
1. OTC Statutes: Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, New Jersey, Delaware, Maryland, Ohio, Illinois, Virginia: the counties of Arlington, Fairfax, Prince William, Stafford and Loudoun.
2. CARB SCM: California except California South Coast.
3. SCAQMD rule 1113: California South Coast counties largely comprising the Los Angeles metropolitan area.
4. LADCO: Illinois, Indiana, and Ohio.
5. All other states follow USEPA AIM VOC rules.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Benjamin Moore & Co.
   2. PPG Paints
   3. Sherwin Williams

2.2 PAINT, GENERAL

A. Material Compatibility:
   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
   1. Flat Paints and Coatings: 50 g/L.
   2. Primers: 50 g/L.
   3. Nonflat Paints and Coatings: 150 g/L.
   4. Dry-Fog Coatings: 400 g/L.
   5. Sealers, and Undercoaters: 200 g/L.
   6. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
   7. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
   8. Pretreatment Wash Primers: 420 g/L.
   9. Floor Coatings: 100 g/L.
   10. Shellacs, Clear: 730 g/L.
   11. Shellacs, Pigmented: 550 g/L.

C. Colors: selected by architect.

2.3 PAINT, PRODUCTS

A. Contractor to only use paints which are suitable for the substrates of those locations.

2.4 SOURCE QUALITY CONTROL

A. All paint shall be from one manufacturer.

B. Owner and Architect reserve the right to reject painting and Contractor is to repair at not additional cost to the Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
      a. Allow masonry to cure a minimum of 30 days prior to paint application regardless of moisture content readings.
   2. Masonry (Clay and CMUs): 12 percent.
   3. Allow masonry to cure a minimum of 30 days prior to paint application regardless of moisture content readings.Wood: 15 percent.
   4. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth and complies with the Level standard specified.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Un-primed Steel Substrates: Remove oil, grease, dust, dirt, rust, and loose mill scale. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. Shop Priming Preparation: SSPC-SP 7/NACE No. 4.
2. Field Priming Preparation: SSPC-SP 11.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:
1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

L. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth. Exercise care to avoid raising nap of paper.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint exposed surfaces, except where the Finish Schedule indicates that a surface or material is not to be painted or is to remain natural. If the schedule does not indicate color or finish, match adjacent materials or surfaces.
3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed in equipment rooms:
      a. Equipment, including panelboards and switch gear.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Tanks that do not have factory-applied final finishes.
      h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   2. Paint the following work where exposed in occupied spaces:
      a. Equipment, including panelboards.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
      h. Other items as directed by Architect.
   3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

F. Stencil Painted Signs: Apply stencil painted signs on both sides of all fire rate Partitions. Locate bottom of the signs no more than 12 inches above removable ceilings. Repeat application of stencil at maximum horizontal spacing of 12 feet and at every intersecting room partition.
   1. Use stencils with all capital letters that are 3” high. Color of sign letters is to be bright red. Font for stencils to be a sans serif font similar to Arial or Helvetica.
   2. Provide stencil painted signs with the following messages corresponding to the new walls. See Life Safety plans for wall ratings.
      a. “1 HOUR RATED WALL”
      b. “2 HOUR RATED WALL”
      c. “3 HOUR RATED WALL”
      d. “1 HOUR RATED WALL AND SMOKE BARRIER”
      e. “2 HOUR RATED WALL AND SMOKE BARRIER”

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Contractor shall touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

C. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated; unless noted otherwise in the Construction Documents.
   1. Pipe and Equipment Identification Schedule:
      a. Painting: Paint entire surface of pipe for mechanical and electrical services in accordance with schedule provided on mechanical and electrical drawings and/or contained in mechanical and electrical specifications.

B. Concrete Substrates, Nontraffic Surfaces: Not less than 2.5 mills dry, acrylic semi-gloss, over 1 coat of block filler and 1 coat of high performance acrylic concrete/masonry primer, unless otherwise indicated.
   1. Areas Subject to Moisture and Food Preparation: Not less than 3.0 mills dry, water-based 2 part catalyzed semi-gloss epoxy over 1 coat of epoxy filler and 1 coat of epoxy sealer.

C. CMU Substrates: Not less than 2.5 mills dry, acrylic semigloss, over 1 coat of block filler and 1 coat of over high performance acrylic concrete/masonry primer, unless otherwise indicated.
   1. Administrative Areas Finish Coats: Not less than 2.5 mills dry, zero VOC latex eggshell.
   2. Areas Subject to Moisture and Food Preparation: Not less than 3.0 mills dry, water-based 2 part catalyzed semi-gloss epoxy over 1 coat of epoxy filler and 1 coat of epoxy primer.

D. Miscellaneous Steel Substrates: 1 coat of rust-inhibitive acrylic universal primer, and not less than 2.5 mills dry, zero VOC acrylic semi-gloss.

E. Steel Handrails: 1 coat of alkyd metal primer, 3 coats of super spec alkyd semi-gloss or equal

F. Shop-Primed Structural Steel Substrates: High build polyamide epoxy intermediate coat with not less than 2.5 mills dry, zero VOC acrylic semi-gloss. 3 coats of finish paint.

G. Galvanized-Metal Substrates, Except Railings: Acrylic universal primer, and not less than 3 mills dry, zero VOC acrylic semi-gloss.

H. Galvanized-Metal Railings: High solids, high build, polyamide epoxy prime coat, with semi-gloss aliphatic acrylic polyurethane finish coat.

I. Aluminum Substrates: Acrylic universal primer, and not less than 3 mills dry, zero VOC acrylic semigloss.

J. Wood Substrates; Opaque Finish: Latex system.

K. Gypsum Board Substrates:
   1. Wall Primer: surfaces scheduled to receive paint finish with a sheen of Gloss Level 2 or greater shall receive ,

2. Walls: Not less than 2.5 mills dry, zero VOC latex eggshell over zero VOC interior latex primer.
3. Ceilings: Not less than 2.5 mills dry, zero VOC latex flat over zero VOC interior latex primer.
4. Epoxy: Not less than 3.0 mills dry, water-based 2 part catalyzed semi-gloss epoxy over epoxy primer.

END OF SECTION

SECTION 10 21 13

PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

B. Related Requirements:
   1. Section 10 28 00 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings: For toilet compartments.
   1. Include plans, elevations, sections, details, and attachment details.
   2. Show locations of cutouts for compartment-mounted toilet accessories.
   3. Show locations of centerlines of toilet fixtures.
   4. Show locations of floor drains.
   5. Show overhead support or bracing locations.

C. Samples for Initial Selection: For each type of toilet compartment material indicated.
   1. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated.
   1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
   2. Each type of hardware and accessory.

E. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of toilet compartment.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 286, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Regulatory Requirements: Comply with applicable provisions in The Department of Justice's 2010 ADA Standards, and IBC and ICC/ANSI A117.1 or other locally enforced accessibility standards, for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Accurate Partitions Corporation.
   2. General Partitions Mfg. Corp.
   3. Scranton Products.

B. Toilet-Enclosure Style: Floor hung and overhead braced.

C. Urinal-Screen Style: Wall hung.

D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
   1. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
   2. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.

E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.

F. Brackets (Fittings):
   1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel or aluminum.

2.3 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
   1. Hinges: Manufacturer's minimum 0.062-inch-thick stainless-steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
   2. Mounting: surface mount
   3. Latch and Keeper: Manufacturer's heavy-duty surface-mounted [aluminum] [stainless-steel] slide latch unit designed to resist damage due to slamming, with combination

rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.

a. Keeper: [2-1/2 inch stainless steel] [6 inch aluminum] [continuous aluminum] with rubber insert.

4. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
5. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors. Mount with through-bolts.
6. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M.

B. Aluminum Extrusions: ASTM B 221.

C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

D. Stainless-Steel Castings: ASTM A 743/A 743M.

2.5 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Coordinate layout and installation of supports, inserts, and anchors built into other units of work for toilet compartment anchorage.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:
   a. Pilasters and Panels: 1/2 inch.
   b. Panels and Walls: 1 inch.

2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.

   a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
   b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Washroom, shower, and custodial accessories.
   2. Hand dryers.
   3. Baby changing stations.
   4. Underlavatory guards.

B. Related Sections:
   1. Section 09 30 13 "Ceramic Tiling" for ceramic toilet and bath accessories.
   2. See Division 10, Toilet Compartments, for hooks on toilet partitions unless hooks are noted otherwise within this Section.
   3. Section 22 07 19 "Plumbing Piping Insulation" for piping insulation used as underlavatory guards to prevent direct contact with and burns from piping.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Include electrical requirements.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify products using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, visible silver spoilage defects.
   2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain accessories from single source from single manufacturer.
   1. When Basis of Design product is listed below, contractor may provide comparable quality and aesthetically consistent product from the available manufacturers listed below.

B. Washrooms, Showers, and Custodial Accessories Manufacturers: Subject to compliance with requirements, provide products by one of the following
   1. AJW Architectural Products.
   2. American Specialties, Inc.
   3. Bobrick Washroom Equipment, Inc.
   4. Bradley Corporation.
   5. GAMCO Specialty Accessories; a division of Bobrick.
   6. Sloan Valve Company

C. Baby Changing Station Manufacturers: Subject to compliance with requirements, provide products by one of the following
   1. American Specialties, Inc.
   2. Diaper Deck & Company, Inc.
   3. Foundations Children's Products.
   4. GAMCO Specialty Accessories; a division of Bobrick.
   5. Koala Kare Products.
   6. SafeStrap Company, Inc. (SSC, Inc.).
   7. Tubular Specialties Manufacturing, Inc.

D. Under Lavatory Guard Manufacturers: Subject to compliance with requirements, provide products by one of the following
   1. Plumberex Specialty Products, Inc.
   2. Truebro by IPS Corporation.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 WASHROOM, SHOWERS, AND CUSTODIAL ACCESSORIES

A. Items:

Recessed Waste Receptacle:

1. Basis-of-Design Product: Bobrick Washroom Equipment.
2. Description: removable waste receptacle.
3. Mounting: Recessed with projecting receptacle.
   a. Designed for nominal 4-inch wall depth.
4. Minimum Waste-Receptacle Capacity: 12 gal.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Liner: Reusable, vinyl waste-receptacle liner.
7. Lockset: Tumbler type for waste receptacle.

Grab Bars:

8. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-6806 Series.
9. Mounting: Flanges with concealed fasteners.
10. Material: Stainless steel, 0.05 inch thick.
    a. Finish: Smooth, No. 4 finish (satin).
11. Outside Diameter: 1-1/2 inches.
12. Configuration and Length: As indicated on Drawings.

Surface Mounted Stainless Steel Baby-Changing Station, Horizontal:

1. Basis-of-Design Product: Koala Kare Products KB110 SSRE.
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
3. Engineered to support a minimum of 200-lb static load when opened.
4. Mounting: Surface mount.
5. Operation: By pneumatic shock-absorbing mechanism.
6. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
7. Liner Dispenser: Built in.

Glass Mirror with Stainless Steel Angle Frame:

8. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-290 Series.
9. Frame: Stainless-steel angle, 0.05 inch thick, beveled inside edge.
   a. Corners: Welded and ground smooth.
10. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
    a. Manufacturer's screw locking design wall bracket.
11. Size:
    a. T70: 18 by 36 inches or as indicated in drawings

T81 Utility Hook:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-211.
2. Description: Single-prong unit.
3. Mounting: Unit secured to concealed wall plate with setscrews.
4. Material and Finish: Satin nickel-plated brass.

T82 Mop and Broom Holder:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-223 x 36
2. Length: 24 inches.
3. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

2.4 UNDERLAVATORY GUARDS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:
   1. Plumberex Specialty Products, Inc. “Handy-Shield Maxx.”
   2. Trubro, “Soft Guard Plus.”

B. Insulating pipe covering for supply and drain piping required to prevent direct contact with piping and to allow service access without removing coverings at all lavatories.

C. Material and Finish: Antimicrobial, molded-plastic, white.

2.5 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

D. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

E. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

F. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Coordinate cutouts in reinforced CMU walls to avoid structural grouted cells. Relocate unit as necessary. Verify required relocation with Architect.

C. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

D. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

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SECTION 12 36 16

METAL COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes stainless-steel countertops, shelves, and sinks.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver metal countertops only after casework has been completed in installation areas.

B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of construction to receive metal countertops by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

B. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Section 07 92 00 "Joint Sealants."

1. Mildew-Resistant Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, silicone.
2. Color: To be selected by architect, either clear or gray.
3. Sealant shall have a VOC content of 250 g/L or less.

2.2 STAINLESS-STEEL COUNTERTOPS, SHELVES AND SINKS

A. Countertops: Fabricate from 0.062-inch-thick, stainless-steel sheet. Provide smooth, clean exposed tops and edges in uniform plane, free of defects. Provide front and end overhang of 1 inch over the base cabinets.

1. Joints: Fabricate countertops without field-made joints in sections for joining in field, with joints at locations indicated.
2. Weld shop-made joints.
3. Sound deaden the undersurface with heavy-build mastic coating.or adhere to plywood.

4. Extend the top down to provide a 2-inch-thick edge with a 1/2-inch return flange.

B. Wall-Mounted Shelves: Fabricate from stainless-steel sheet, not less than 0.050-inch nominal thickness. Weld shop-made joints. Fold down the front edge a minimum of 3/4 inch; fold up the back edge a minimum of 3 inches. Provide integral stiffening brackets, formed by folding up ends a minimum of 3/4 inch and by welding to upturned back edge, front and back edges.

C. Stainless-Steel Sinks: Fabricate from stainless-steel sheet, not less than 0.050-inch nominal thickness. Fabricate with corners rounded and coved to at least 5/8-inch radius. Slope the sink bottoms to outlet without channeling or grooving. Provide continuous butt-welded joints.
   1. Provide sizes indicated or manufacturer's closest standard size of equal or greater volume, as approved by Architect.
   2. Provide double-wall construction for sink partitions with top edge rounded to at least 1/2-inch diameter.
   3. Factory punch holes for fittings.
   4. Provide sinks with stainless-steel strainers and tailpieces.
   5. Provide sinks with integral rims except where located in stainless-steel countertops.
   6. Apply 1/8-inch-thick coating of heat-resistant, sound-deadening mastic to undersink surfaces.

2.3 STAINLESS-STEEL FINISH

A. Grind and polish surfaces to produce uniform, directional satin finish matching No. 4 finish, with no evidence of welds and free of cross scratches. Run grain with long dimension of each piece. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces clean.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of metal countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install metal countertops level, plumb, and true; shim as required, using concealed shims.

B. Field Jointing: Where possible, make field jointing in the same manner as shop jointing; use fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

C. Secure tops to cabinets with Z- or L-type fasteners or equivalent; use two or more fasteners at each front, end, and back.

D. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.

E. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

F. Wall-Mounted Shelves: Fasten to masonry, partition framing, blocking, or reinforcements in partitions. Fasten each shelf through upturned back edge at not less than 24 inches o.c.

G. Counter metal to be discontinuous under pass thru window to eliminate thermal bridge.

3.3 CLEANING AND PROTECTION

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over the countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

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SECTION 32 10 00
TERMITE CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Soil treatment for termite control.

1.2 SUBMITTALS

A. Submit manufacturer's technical product data and application instructions prior to application for Architect's approval.

B. Submit sample copies of the Termite Soil Treatment Guarantee form prior to application for Architect's approval.

C. Quality Assurance/Control Submittals: Submit identification of at least 3 projects of similar scope along with name, address, and telephone number of the Architect, Owner and General Contractor.

1.3 QUALITY ASSURANCE

A. In addition to the requirements of these Specifications, comply with manufacturer's instructions and recommendations for the Work, including preparation of substrate and application.

B. Engage a professional pest control operator, licensed by the State of Mississippi, Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry, and in accordance with regulations of governing authorities for application of soil treatment solution. The pest control operator is to have the aforementioned valid license, the company technician is to have a valid identification card for pest control, and the company vehicle is to be clearly marked with the company name.

C. The professional pest control operator specializing in Soil Treatment for Termite Control, with 5 years minimum experience, who has completed work similar to that indicated for this project and with a record of successful in-service performance.

D. Comply with Mississippi Regulations Governing Pest Control Operators in following the labels of the termiticide.

1.4 PROJECT CONDITIONS

A. Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

B. To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with other handling and application instructions of the soil toxicant manufacturer.

C. Remove all non-pressure treated wood contacting soil. Remove grade stakes prior to applying horizontal barrier and all form boards, stakes and concrete over pour prior to applying vertical soil treatment.

1.5 GUARANTEE

A. Furnish 2 copies of written guarantee certifying that the applied soil poisoning treatment will prevent the infestation of subterranean termites and, that termite contractor will re-treat the soil and also repair or replace any damage caused by termite infestation without expense to the Owner. Provide guarantee for a period of 5 years from the date of treatment, signed by the Applicator and the Contractor.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION

A. Use an emulsible concentrate insecticide for dilution with water specially formulated to prevent infestation by termites as recommended by the Southern Forest Experiment Station, Forest Insect Laboratory at Gulfport, Mississippi, and registered by the Bureau of Plant Industry for use in structural pest control work. Fuel oil will not be permitted as a diligent. Provide a working solution of one of the following chemical elements:

1. Horizontal barrier: Cypermethrin, Prevail or Talstar.
2. Vertical barrier: Fipronil.

B. Other solutions may be used as recommended by Applicator and if acceptable to local and state governing authorities. Use only soil treatment solutions that are not injurious to plants.

PART 3 - EXECUTION

3.1 INSPECTION

A. Applicator must examine the areas and conditions under which soil treatment for termite control is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Applicator.

3.2 APPLICATION

A. Remove foreign matter, which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.

B. Application Rates: Under slab-on-grade, suspended slab, foundation footings and other similar structures, treat the soil before concrete slabs are poured using either power sprayer or tank-type garden sprayer. Apply soil treatment solution, using color dye marking agent to insure the area is treated, as follows:

1. Termiticide applied for the prevention of termites shall comply with the manufacturer's label and shall not be applied at concentrations or volumes less than specified on the label.
2. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application.
3. Under slab-on-grade structures, grade beams and footings, treat the soil before concrete slabs are poured using either power sprayer or tank-type garden sprayer.
    a. Apply 4 gallons of chemical solution per 20 linear feet to the soil at critical areas under the slab, such as along the inside of foundation walls, along both sides of interior partition walls, and around plumbing.
    b. Apply one gallon of chemical solution per 10 square feet as an overall treatment under the slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution per 10 sq. ft. to those areas where fill is washed gravel or other coarse absorbent material.
    c. Apply 4 gallons of chemical solution per 10 linear feet of trench, for each foot of depth from grade to footing, along the outside edge of the building. Dig a trench 6" to 8" wide along the outside of the foundation to a depth of not less than 12". Punch holes to top of footing at not more than 12" o.c. and apply chemical solution with the soil as it is being replaced in the trench.
    d. In absorbent soil or fill (sand and gravel mix, etc.) increase the application rate to 1-1/2 gallons per 10 square feet where one gallon to 10 square feet is specified.

C. Allow a minimum of 12 hours for drying after application, before beginning concrete placement or other construction activities.

3.3 PROTECTION

A. Prior to each application, the applicator shall notify the Contractor of the intended application and instruct the responsible person to notify construction workers and other site individuals to leave the treated are and not to return until chemical has been installed into the soil.

B. Post signs in the areas of application warning workers that soil poisoning has been applied. Remove signs when areas are covered by other construction.

END OF SECTION

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