SECTION 07 31 13

ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Asphalt shingles.
   2. Underlayment.

B. Related Sections:
   1. Division 6 Section "Rough Carpentry" for wood framing.
   2. Division 6 Section "Sheathing" for roof sheathing.
   3. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, counterflashings and flashings.

1.3 DEFINITION

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

1.4 SUBMITTALS

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

B. Samples for Verification: For the following products, of sizes indicated, to verify color selected:
   1. Asphalt Shingle: Full size.
   2. Ridge and Hip Cap Shingles: Full size.
   3. Ridge Vent: 12-inch- (300-mm-) long Sample.
   4. Self-Adhering Underlayment: 12 inches (300 mm) square.

C. Qualification Data: For qualified installer.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.

E. Research/Evaluation Reports: For each type of asphalt shingle required, from the ICC.

F. Maintenance Data: For each type of asphalt shingle to include in maintenance manuals.
G. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install asphalt shingles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period.

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

a. Manufacturing defects.

b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.

2. Material Warranty Period: 50 years from date of Substantial Completion, prorated, with first 6 years nonprorated.
3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 90 mph for five years from date of Substantial Completion.

4. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 10 years from date of Substantial Completion.

B. Special Project Warranty: Roofing Installer's Warranty, or warranty form at end of this Section, signed by roofing Installer, covering the Work of this Section, in which roofing Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.

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

PART 2 - PRODUCTS

2.1 GLASS-FIBER-REINFORCED ASPHALT SHINGLES


1. Basis-of-Design Product: PABCO "Premier" laminated shingles. Subject to compliance with requirements, provide or comparable product by one of the following:

   b. CertainTeed Corporation.
   c. Elk Premium Building Products, Inc.; an ElkCorp company.
   d. Emco Building Products Corp.
   e. GAF Materials Corporation.
   f. IKO.
   g. Malarkey Roofing Products.
   h. Owens Corning.
   i. TAMKO Roofing Products, Inc.

3. Strip Size: Manufacturer's standard.
4. Algae Resistance: Granules treated to resist algae discoloration.
5. Color and Blends: As selected by Architect from manufacturer's full range of colors.

2.2 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226 or ASTM D 4869, Type II, asphalt-saturated organic felts, nonperforated.

B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil-(1.0-mm-) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.

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

   a. Carlisle Coatings & Waterproofing, Inc.
   c. Henry Company.
d. Johns Manville.

C. Granular-Surfaced Valley Lining: ASTM D 3909, mineral-granular-surfaced, glass-felt-based, asphalt roll roofing; 36 inches (914 mm) wide.

2.3 RIDGE VENTS

A. Rigid Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent with nonwoven geotextile filter strips; for use under ridge shingles.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide Pabco Evolution Ridge Vent or comparable product by one of the following:

   a. Air Vent, Inc.; a Gibraltar Industries company.
   b. Cor-A-Vent, Inc.
   c. GAF Materials Corporation.
   d. Lomanco, Inc.
   e. Mid-America Building Products.
   f. Obdyke, Benjamin Incorporated.
   g. Owens Corning.
   h. RGM Products, Inc.
   i. Trimline Building Products.

3. Minimum Net Free Area: 9 square inches per foot.

2.4 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, smooth shank, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch (25-mm) minimum diameter.

2.5 METAL FLASHING AND TRIM

A. General: Comply with requirements in Division 7 Section "Sheet Metal Flashing and Trim."

EWU New Residence Hall
ALSC Project No. 2011-007

Asphalt Shingles
07 31 13-4
1. **Sheet Metal**: Pre-painted aluminum.

B. **Fabricate sheet metal flashing and trim** to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

1. **Apron Flashings**: Fabricate with lower flange a minimum of 5 inches (125 mm) over and 4 inches (100 mm) beyond each side of downslope asphalt shingles and 6 inches (150 mm) up the vertical surface.
2. **Step Flashings**: Fabricate with a headlap of 2 inches (50 mm) and a minimum extension of 5 inches (125 mm) over the underlying asphalt shingle and up the vertical surface.
3. **Open-Valley Flashings**: Fabricate in lengths not exceeding 10 feet (3 m) with 1-inch- (25-mm-) high, inverted-V profile at center of valley and equal flange widths of 12 inches (300 mm).
4. **Drip Edges**: Fabricate in lengths not exceeding 10 feet (3 m) with 2-inch (50-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.6-mm) drip at lower edge.

C. **Vent Pipe Flashings**: ASTM B 749, Type L51121, at least 1/16 inch (1.6 mm) thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches (100 mm) from pipe onto roof.

**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.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.

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

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

3.2 **UNDERLAYMENT INSTALLATION**

A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

B. Contractor option to provide self-adhering sheet underlayment or double-layer felt underlayment on areas of roof with a slope between 2:12 and 4:12.
C. Double-Layer Felt Underlayment: Install on roof deck parallel with and starting at the eaves. Install a 19-inch- (485-mm-) wide starter course at eaves and completely cover with full-width second course. Install succeeding courses lapping previous courses 19 inches (485 mm) in shingle fashion. Lap ends a minimum of 6 inches (150 mm). Stagger end laps between succeeding courses at least 72 inches (1830 mm). Fasten with felt underlayment nails.

1. Apply a continuous layer of asphalt roofing cement over starter course and on felt underlayment surface to be concealed by succeeding courses as each felt course is installed. Apply over entire roof with slope between 2:12 AND 4:12.
2. Install felt underlayment on roof sheathing not covered by self-adhering sheet underlayment. Lap edges over self-adhering sheet underlayment not less than 3 inches (75 mm) in direction to shed water.
3. Terminate felt underlayment extended up not less than 4 inches (100 mm) against sidewalls, curbs, chimneys, and other roof projections.
4. Install fasteners at no more than 36 inch (900 mm) o.c.

D. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below on Drawings, lapped in direction to shed water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.

1. Sidewalls: Extend beyond sidewall 18 inches (450 mm), and return vertically against sidewall not less than 6 inches.
2. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Return vertically against penetrating element not less than 6 inches.
3. Eaves: Extend from edges of eaves 36 inches (914 mm) beyond interior face of exterior wall.
4. Rakes: Extend from edges of rake 36 inches (914 mm) beyond interior face of exterior wall.
5. Valleys: Extend from lowest to highest point 18 inches (450 mm) on each side.
6. Hips: Extend 18 inches (450 mm) on each side.
7. Ridges: Extend 36 inches (914 mm) on each side without obstructing continuous ridge vent slot.
8. Roof Slope Transitions: Extend 18 inches (450 mm) on each roof slope.

E. Metal-Flushed, Open-Valley Underlayment: Install two layers of 36-inch- (914-mm-) wide felt underlayment centered in valley. Stagger end laps between layers at least 72 inches (1830 mm). Lap ends of each layer at least 12 inches (300 mm) in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck with roofing nails.

1. Lap roof-deck felt underlayment over first layer of valley felt underlayment at least 6 inches (150 mm).

3.3 METAL FLASHING INSTALLATION

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

1. Install metal flashings according to recommendations in ARMA’s "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA’s "The NRCA Roofing and Waterproofing Manual."
B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.

C. Step Flashings: Install with a headlap of 2 inches (50 mm) and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

D. Backer Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.

E. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inches (200 mm) in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.
   1. Adhere 9-inch- (225-mm-) wide strip of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.

F. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.

G. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.

H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT SHINGLE INSTALLATION


B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip at least 7 inches (175 mm) wide with self-sealing strip face up at roof edge.
   1. Extend asphalt shingles 3/4 inch (19 mm) over fasciae at eaves and rakes.
   2. Install starter strip along rake edge.

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

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

E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.

F. Fasten asphalt shingle strips with a minimum of four roofing nails located according to manufacturer's written instructions.
   1. Where roof slope exceeds 20:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.
   2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
3. When ambient temperature during installation is below 50 deg F (10 deg C), seal asphalt shingles with asphalt roofing cement spots.

G. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley from highest to lowest point.

1. Set valley edge of asphalt shingles in a 3-inch- (75-mm-) wide bed of asphalt roofing cement.
2. Do not nail asphalt shingles to metal open-valley flashings.

H. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

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

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

END OF SECTION 07 31 13
SECTION 07 42 13
METAL WALL AND SOFFIT PANELS

1.1 SUMMARY
A. Factory-formed and field-assembled concealed-fastener, lap-seam metal panels.

1.2 PERFORMANCE REQUIREMENTS
A. Air Infiltration: ASTM E 283.
B. Water Penetration under Static Pressure: ASTM E 331.
C. Water Penetration under Dynamic Pressure: AAMA 501.1.
D. Structural Performance: ASTM E 1592.
   2. Deflection Limits: 1/240.

1.3 QUALITY ASSURANCE
A. Mockups for each form of construction.

1.4 WARRANTY
A. Materials and Workmanship: Two years.
B. Finishes: 20 years.

1.5 MATERIALS
A. Miscellaneous Metal Framing: Subgirts base or sill angles or channels hat-shaped, rigid furring channels cold-rolled furring channels and Z-shaped furring.

1.6 PRODUCTS
A. Concealed-Fastener, Lap-Seam Metal Wall Panels:
   3. Exterior Finish: 3-coat fluoropolymer.
   4. Reveal Option: One pencil rib.
   5. Coverage: 12".
   6. Depth: 1-1/2".
   7. Reveal: None.
B. Accessories: Flashing and trim.

END OF SECTION 07 42 13
SECTION 07 52 16

STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

1.1 PERFORMANCE REQUIREMENTS

A. Roofing System Design: Uplift pressures calculated according to ASCE/SEI 7.

B. FM Approvals Listing: [Class 1A-60] [Class 1A-75] [Class 1A-90] [Class 1A-105] [Class 1A-120] <Insert class>.

C. Cool Roof Performance: [LEED - low slope] [LEED - steep slope] [ENERGY STAR - low slope] [ENERGY STAR - steep slope] [CEC-Title 24].

1.2 QUALITY ASSURANCE

A. Exterior Fire-Test Exposure: Class [A] [B] [C].

B. [Preliminary roofing] [and] [preinstallation roofing] conference.

1.3 WARRANTY

A. Manufacturer’s Materials and Workmanship Warranty: [10] [15] <Insert number> years.

B. Installer’s Warranty: [Two] <Insert number> years.

1.4 MATERIALS

A. Roofing Membrane Sheet: SBS-modified asphalt sheet, reinforced with [polyester fabric] [glass fibers] [a combination of polyester fabric and glass fibers], smooth surfaced.

B. Roofing Membrane Cap Sheet: SBS-modified asphalt sheet, reinforced with [polyester fabric] [glass fibers] [a combination of polyester fabric and glass fibers], [smooth] [granular] [metal-foil] surfaced.

C. Sheathing paper.

D. Base Sheet: [SBS modified, asphalt-coated sheet, with glass-fiber-reinforcing mat] [Asphalt coated, glass-fiber sheet] [Venting, nonperforated, asphalt coated, glass-fiber sheet] [Asphalt-coated organic felt].

E. Base-Ply Sheet: Asphalt-impregnated, glass-fiber felt.

F. Base Flashing Sheet:


G. Aggregate Surfacing: Gravel or crushed stone.

H. Substrate Board: Type X gypsum wall board, Glass-mat, water-resistant gypsum substrate, Cellulosic-fiber-reinforced, water-resistant gypsum substrate, Perlite board.


1. Tapered Insulation: 1/4 inch per 12 inches (1:48) <Insert slope>.

K. Tapered edge strips.

L. Cover Board: Cellulosic-fiber insulation board, OSB, Glass-mat, water-resistant gypsum substrate, Cellulosic-fiber-reinforced, water-resistant gypsum substrate.

M. Walkways:

1. Pads: Reinforced asphaltic composition pads with mineral-granule surface, Polymer-modified, reconstituted rubber pads.


1.5 ROOF PAVERS

A. Lightweight Roof Pavers: Interlocking, lightweight concrete units, specially factory cast for use as roof ballast, grooved back, with four-way drainage capability; beveled, doweled or otherwise profiled.

B. Heavyweight Roof Pavers: Heavyweight, hydraulically pressed, concrete units, square edged, with top edges beveled 3/16 inch (5 mm), factory cast for use as roof pavers; absorption not greater than 5 percent, ASTM C 140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C 67.

1.6 INSTALLATION

A. Roof Insulation: Adhered, Mechanically fastened, Mechanically fastened and adhered.

B. Roofing Membrane System:

1. Deck Type: N (nailable) I (insulated) C (concrete or nonnailable).


3. Base Sheet: One, installed over sheathing paper.

4. Number of Glass-Fiber Base-Ply Sheets: One, Two <Insert number>.

5. Number of SBS-Modified Asphalt Shingles: One, Two.
6. Surfacing Type: [A (aggregate)] [M (mineral-granule-surfaced cap sheet)] [F (foil-surfaced cap sheet)].

1.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner engaged.

END OF SECTION 07 52 16
SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manufactured Products:
   a. Manufactured through-wall flashing and counterflashing.
   b. Manufactured reglets and counterflashing.

2. Formed Products:
   a. Formed roof drainage sheet metal fabrications.
   b. Formed low-slope roof sheet metal fabrications.
   c. Formed wall sheet metal fabrications.
   d. Formed equipment support flashing.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 Section "SBS Modified Bituminous Membrane Roofing" for installing sheet metal flashing and trim integral with membrane roofing.
3. Division 07 Section "Metal Wall Panels" for sheet metal flashing and trim integral with metal wall panels.
4. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated 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. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:

1. Wind Zone 1: For velocity pressures of 21 to 30 lb/sq. ft. (1.00 to 1.44 kPa): 60-lb/sq. ft. (2.87-kPa) perimeter uplift force, 90-lb/sq. ft. (4.31-kPa) corner uplift force, and 30-lb/sq. ft. (1.44-kPa) outward force.
C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches (1:10).

B. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that 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.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA’s "Architectural Sheet Metal Manual" unless more stringent requirements are specified.

C. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
1.6 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 the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which 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: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

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

B. Prefinished, Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.

2. Surface: Smooth, flat.

3. Exposed Coil-Coated Finish:

   a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

4. Color: As indicated in Division 9, Finishes Legend.

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
2.2 UNDERLAYMENT MATERIALS

A. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.

B. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

C. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item 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 or manufactured item.

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.
   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 Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

C. Solder:

1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent lead and 50 percent tin and 50 percent tin. For Grade Sn60, 60 percent tin and 40 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non sag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

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

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

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

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Cheney Flashing Company.
   b. Fry Reglet Corporation.
   c. Hickman, W. P. Company.

2. Material: Stainless steel, 0.019 inch (0.48 mm) thick.
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
6. Accessories:
   a. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the 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 without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed 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 (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

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

F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams. Flat-lock seams.国外 edges to be seamed, form seams, and solder.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from the same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from the same metal as gutters.

1. Gutter Style: SMACNA designation A.
2. Expansion Joints: Butt type.
3. Accessories: Continuous removable leaf screen with sheet metal frame and hardware cloth screen and wire ball downspout strainer.
4. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following material:
   a. Prepainted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.
   b. Color: See Finishes Legend.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from [same material as downspouts and anchors] <Insert material>[ Shop fabricate elbows.]

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. Manufactured Hanger Style: [Fig 1-34A] [Fig 1-34B] [Fig 1-34C] [Fig 1-34D] [Fig 1-34E] according to SMACNA's "Architectural Sheet Metal Manual."
3. Hanger Style: <Insert description>.
4. Fabricate from the following materials:
   a. Copper: [16 oz./sq. ft. (0.55 mm thick)] <Insert weight (thickness)>.
   b. Aluminum: [0.024 inch (0.61 mm)] <Insert dimension> thick.
   c. Stainless Steel: [0.016 inch (0.40 mm)] <Insert dimension> thick.
   d. Zinc-Tin Alloy-Coated Stainless Steel: [0.015 inch (0.38 mm)] <Insert dimension> thick.
   e. Zinc-Tin Alloy-Coated Copper: [16 oz./sq. ft. (0.55 mm thick)] <Insert weight (thickness)>.
   f. Galvanized Steel: [0.022 inch (0.56 mm)] <Insert dimension> thick.
   g. Aluminum-Zinc Alloy-Coated Steel: [0.022 inch (0.56 mm)] <Insert dimension> thick.
h. Zinc: [0.032 inch (0.80 mm)] [0.039 inch (1.00 mm)] <Insert dimension> thick.

i. Copper-Clad Stainless Steel: [0.016 inch (0.40 mm)] <Insert dimension> thick.

C. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Pre-Painted, Metallic-Coated Steel: 0.028 inch (0.71 mm) thick.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated complete with outlet tubes, exterior flange trim. Fabricate from the following materials:

1. Pre-Painted, Metallic Coated Steel: 0.028 inch (0.71 mm) thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) 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, seal, and solder or weld watertight.

1. Coping Profile: SMACNA figure designation 3-4A unless otherwise indicated.
2. Joint Style: Butt, with 12-inch- (300-mm-) wide, concealed backup plate.
3. Fabricate from the following materials:

a. Pre-painted, Metallic-Coated Steel: 0.0396 inch (1.0 mm) thick.

B. Roof Edge Flashing: Fabricate in minimum 10-foot- (3-m-) long, sections. Furnish with 6-inch- (150-mm-) wide joint back-up plates.

1. Joint Style: Butt, with 12-inch- (300-mm-) wide concealed backup plate.
2. Fabricate from the following material: Pre-painted, Metallic-coated Steel: .0336 inch thick.

C. Roof and Roof to Wall Transition, Roof to Sheet Metal Roof Edging Transition: Fabricate from the following material:

1. Pre-painted, Metallic-Coated Steel: 0.0336 inch (0.85 mm) thick.

D. Base Flashing: Fabricate from the following material:

1. Pre-painted, Metallic-Coated Steel: 0.0276 inch (0.7 mm) thick.

E. Counterflashings: Fabricate from the following material:

1. Pre-painted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

F. Flashing Receivers: Fabricate from the following material:

1. Pre-painted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

G. Roof-Penetration Flashing: Fabricate from the following material:
1. Stainless Steel: 0.0187 inch (0.5 mm).

H. Roof Drain Flashing: Fabricate from the following material:
   1. Stainless Steel: 0.0156 inch (0.4 mm).

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following material:
   1. Prepainted, Metallic-Coated Steel: 0.0276 inch (0.7 mm) thick.

B. Drip Edges: Fabricate from the following material:
   1. Prepainted, metallic-coated steel: 0.022 inch (0.56 mm) thick.

C. Eave and Rake Fascias: Fabricate from the following material:
   1. Prepainted, metallic-coated steel: 0.0375 (0.95 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

   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.

B. For the record, prepare written report, endorsed by installer, listing conditions detrimental to performance of the Work.

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

3.2 INSTALLATION, 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, welding rods, 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 and levels indicated. 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 (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws or metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), 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 (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder pre-painted metallic-coated steel sheet.
2. Pre-tinning is not required for lead.
3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
B. **Hanging Gutters:** Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets or straps spaced not more than 36 inches (900 mm) apart. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.
2. Loosely lock straps to front gutter bead and anchor to roof deck.
3. Anchor and loosely lock back edge of gutter to continuous cleat.
4. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.

C. **Downspouts:** See Division 5 Section “Metal Fabrications”.

D. **Parapet Scuppers:** Install scuppers where indicated through parapet. 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 solder or seal with elastomeric sealant to scupper.

E. **Conductor Heads:** Anchor securely to wall with elevation of conductor head rim 1 inch (25 mm) below scupper discharge.

3.4 **ROOF FLASHING INSTALLATION**

A. **General:** Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer’s written installation instructions, and SMACNA’s “Architectural Sheet Metal Manual.” Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. **Roof Edge Flashing:** Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 24-inch (600-mm) centers.

C. **Copings:** Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.

1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch (600-mm) centers.
2. Anchor interior leg of coping with screw fasteners and washers at 24-inch (600-mm) centers.

D. **Pipe or Post Counterflashings:** Install counterflashings umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. **Counterflashings:** Coordinate installation of counterflashings with installation of base flashing. Insert counterflashings in reglets or receivers and fit tightly to base flashing. Extend counterflashings 4 inches (100 mm) over base flashing. Lap counterflashings joints a minimum of 4 inches (100 mm) and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36-inch (900-mm) centers.
F. 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.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as 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 Division 04 Section "Unit Masonry."

C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 MISCELLANEOUS FLASHING INSTALLATION

A. Overhead-Piping Safety Pans: Suspend pans independent from structure above as indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

B. 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.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) 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.”

3.8 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 installation, remove unused materials and clean finished surfaces. Maintain in a 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 07 62 00
SECTION 07 72 53
SNOW GUARDS

1.1 PRODUCTS

A. Flat-Mounted Metal Snow Guard Pads for Installation on Asphalt Shingle Roofing:

1. Material: Manufacturer's standard noncorrosive metal.
2. Finish: Powder coat.

END OF SECTION 07 72 53
SECTION 07 81 23
INTUMESCENT FIREPROOFING

1.1 SUMMARY

A. Mastic and intumescent fire-resistive coatings (MIFRC).

1.2 QUALITY ASSURANCE

A. Mockups for each type of fireproofing, substrate, and finish.

1.3 MATERIALS

A. Fire-Resistance Design: Tested according to [ASTM E 119] [ASTM E 119 or UL 263] <Insert testing requirement>. Steel members are considered [unrestrained] [restrained].

B. VOC Content: Complying with LEED-NC, LEED-CI, or LEED-CS Credit EQ 4.2.

C. Low-Emitting Materials: Complying with LEED for Schools Credit EQ 4.

D. MIFRC: For [exterior] [interior general purpose] [and] [conditioned interior space purpose] use.
   1. Surface-Burning Characteristics: Flame-Spread Index of [25] <Insert number> or less and smoke-developed index of [50] [450] <Insert number> or less.
   2. Hardness: Not less than [45] [65] [80] <Insert value>, Type D durometer.
   3. Finish: [As selected by Architect from manufacturer's standard finishes] [Spray-textured finish] [Rolled, spray-textured finish] <Insert requirement>.

E. Auxiliary Materials: According to fire-resistance designs indicated.

1.4 FIELD QUALITY CONTROL

A. Special Inspections: [Owner] [Contractor] engaged.

END OF SECTION 07 81 23
SECTION 07 84 13
PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.

1.3 ACTION SUBMITTALS

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

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency’s illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer’s written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer’s products per specified requirements. Manufacturer’s willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
   a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
   b. Classification markings on penetration firestopping correspond to designations listed by the following:
      1) UL in its "Fire Resistance Directory."

C. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Grace Construction Products.
2. Hilti, Inc.
4. RectorSeal Corporation.
5. 3M Fire Protection Products.
2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Fire-resistance-rated walls include fire walls.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

F. Low-Emitting Materials: Penetration firestopping sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:
   a. Slag-wool-fiber or rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.

2. Temporary forming materials.
5. Steel sleeves.
2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words “Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage.”
2. Contractor’s name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer’s name.
6. Installer’s name.

3.5 FIELD QUALITY CONTROL

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

B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.
3.7 PENETRATION FIRESTOPPING SCHEDULE

A. For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed through-penetration firestop system selected from the applicable UL number range listed below that complies with Section 07 84 13 - Through Penetration Firestop Systems and is suitable for the penetration conditions indicated for the Project.

<table>
<thead>
<tr>
<th>Construction Conditions</th>
<th>Manufacturers</th>
<th>Product</th>
<th>Installation Spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Metal pipe or conduit through framed walls</td>
<td>Metacaulk</td>
<td>950</td>
<td>WL 1026</td>
</tr>
<tr>
<td></td>
<td>Metacaulk</td>
<td>835</td>
<td>WL 1034</td>
</tr>
<tr>
<td></td>
<td>Bio Fireshield</td>
<td>Biostop 500</td>
<td>MP2GWB</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CP2SWB</td>
<td>UL System 147A</td>
</tr>
<tr>
<td>B. Metal pipe or conduit through concrete and masonry walls and floors</td>
<td>Metacaulk</td>
<td>950</td>
<td>CAJ 1035</td>
</tr>
<tr>
<td></td>
<td>Metacaulk</td>
<td>835</td>
<td>WJ1013</td>
</tr>
<tr>
<td></td>
<td>BioFireshield</td>
<td>100, 200</td>
<td>MP2 CNF</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CP2SWB</td>
<td>UL System 319</td>
</tr>
<tr>
<td>C. Insulated metal pipe through framed walls</td>
<td>Metacaulk</td>
<td>7000</td>
<td>WL 5057</td>
</tr>
<tr>
<td></td>
<td>BioFireshield</td>
<td>Biostop 500</td>
<td>IMP2GWB</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>FS195</td>
<td>UL System 147</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CP25N/S</td>
<td>UL System 147</td>
</tr>
<tr>
<td>D. Insulated metal pipe through concrete and Masonry walls and floors</td>
<td>Metacaulk</td>
<td>1000</td>
<td>CAJ 5077</td>
</tr>
<tr>
<td></td>
<td>BioFireshield</td>
<td>Biostop 500</td>
<td>IMP2CNF</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>See Mfg</td>
<td>UL System 91, 152,</td>
</tr>
<tr>
<td>E. Plastic Pipe through framed walls</td>
<td>Metacaulk</td>
<td>1000</td>
<td>WL 2104</td>
</tr>
<tr>
<td></td>
<td>Metacaulk</td>
<td>WRAPSTRIP</td>
<td>WL 2106</td>
</tr>
<tr>
<td></td>
<td>BioFireshield</td>
<td>Biostop500</td>
<td>PPCSIGWB</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>FS195</td>
<td>UL System 148</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CP25N/S</td>
<td>SP389</td>
</tr>
<tr>
<td>F. Plastic Pipe through concrete and masonry walls and floors</td>
<td>Metacaulk</td>
<td>880</td>
<td>UL System 64</td>
</tr>
<tr>
<td></td>
<td>Biofireshield</td>
<td>Mfg Spec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CS195</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>FS195</td>
<td></td>
</tr>
<tr>
<td>G. Cable Tray through concrete and masonry walls and floors</td>
<td>Metacaulk</td>
<td>Mortar</td>
<td>W7/Cl</td>
</tr>
<tr>
<td></td>
<td>Biofireshield</td>
<td>Mortar</td>
<td>CBL36NW</td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CP25N/S</td>
<td>UL Sys. 105 or 66</td>
</tr>
<tr>
<td>Construction Conditions</td>
<td>Manufacturers</td>
<td>Product</td>
<td>Installation Spec.</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------</td>
<td>-----------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>(G2) Cable tray through Framed walls</td>
<td>Metacaulk</td>
<td>Mortar</td>
<td>Appropriate UL system or Architectural System Manufacturer Spec CS195 UL System 557</td>
</tr>
<tr>
<td></td>
<td>Biofireshield</td>
<td>Mortar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(G3) Alternately, terminate cable tray prior to firewall designer modify</td>
<td>Metacaulk</td>
<td></td>
<td>Appropriate UL system or Architectural Detail Manufacturers spec</td>
</tr>
<tr>
<td></td>
<td>Biofireshield</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. Telephone, fiber optic and other small miscellaneous conductors through Framed wall.</td>
<td>Metacaulk</td>
<td>950</td>
<td>WL 8001 Mf Spec UL System 149</td>
</tr>
<tr>
<td></td>
<td>Biofireshield</td>
<td>Biostop 500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3M</td>
<td>CP 25N/S</td>
<td></td>
</tr>
</tbody>
</table>

* See UL Listing or Manufacturer's Specifications for associated components not listed (i.e., sleeves, collars, mineral wool, etc.)

** Insulated cable, bus ducts, glass pipe, and other penetrations and construction conditions not listed above shall be firestopped with an approved UL system as defined by the Fire Resistance Directory.

END OF SECTION 07 84 13
SECTION 07 84 46
FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes fire-resistive joint systems for the following:

1. Head-of-wall joints.
2. Wall-to-wall joints.

B. Related Sections include the following:

1. Division 7 Section "Through-Penetration Firestop Systems" for systems installed in openings in walls and floors with and without penetrating items.
2. Division 7 Section "Joint Sealants" for non-fire-resistive joint sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: For joints in the following constructions, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed:

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.

B. Fire Resistance of Perimeter Fire-Containment Systems: Integrity and insulation ratings indicated as determined in accordance with IBC Section 712.3 and UL 2079.

1.4 SUBMITTALS

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

B. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed and relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.

2. Maintain a set of approved fire-resistive joint system drawings at the job site throughout the duration of the project for review by code authorities at job site inspections. Submit product data and shop drawings to code authorities.

C. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.

D. Qualification Data: For Installer.

E. Compatibility and Adhesion Test Reports: From fire-resistive joint system manufacturer indicating the following:

1. Materials forming joint substrates have been tested for compatibility and adhesion with fill materials.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.


1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain fire-resistive joint systems for each kind of joint and construction condition indicated through one source from a single manufacturer.

B. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

C. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

D. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements, those specified in "Performance Requirements" Article and the Fire-Resistive Joint System Schedule in Part 3.

1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.

2. Fire-resistive joint systems are identical to those tested per ICBO ES AC30 and are qualified for types of joints and joint movement capabilities indicated in a current Evaluation Report by the ICBO Evaluation Service.

3. Fire-resistive joint systems are identical to those tested per ICBO ES AC30 and are qualified for joint movement capabilities indicated in a current ICBO Evaluation Report by the ICBO Evaluation Service. Perimeter fire-containment systems are identical to those tested per UL 2079. Provide rated systems complying with the following requirements:
a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.

b. Fire-resistive joint systems correspond to those indicated by referencing system designations listed by the following:

1) UL in its “Fire Resistance Directory.”

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency’s classification marking applicable to Project and with intact and legible manufacturers’ labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate fire-resistive joint systems per manufacturer’s written instructions by natural means or, if this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

C. Notify Owner’s inspecting agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.

D. Do not conceal fire-resistive joint system installations that will become concealed behind other construction until Owner’s inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work includes, but are not limited to the products specified.

1. Fire-Resistive Joint Systems:
   a. Hilti, Inc.
b. RectorSeal Corporation (The).
c. Specified Technologies Inc.
d. 3M Fire Protection Products.
e. Tremco, Inc.
f. United States Gypsum Company.

2.2 FIRE-RESISTIVE JOINT SYSTEMS, GENERAL

A. Compatibility: Provide fire-resistant joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistant joint system manufacturer based on testing and field experience.

B. Accessories: Provide components of fire-resistant joint systems, including forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistant joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance.

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

3.2 PREPARATION

A. Surface Cleaning: Clean joints immediately before installing fire-resistant joint systems to comply with fire-resistant joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by fire-resistant joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent fill materials of fire-resistant joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistant joint system materials. Remove tape as soon as possible without disturbing fire-resistant joint system's seal with substrates.
3.3 INSTALLATION

A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.

B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and to prepare inspection reports.

1. Inspecting agency will state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.

B. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and inspecting agency has approved installed fire-resistive joint systems.

C. Where deficiencies are found, repair or replace fire-resistive joint systems so they comply with requirements.

3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.
3.6 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

A. For each location where a fire-resistive joint system is required for the rated floor or wall, provide a UL-listed system selected from the applicable UL number range listed below that complies with Section 07 84 46 – Fire-Resistive Joint Systems and is suitable for the conditions indicated for the Project.

<table>
<thead>
<tr>
<th>TYPE OF PENETRANT</th>
<th>NOMINAL JOINT WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than or Equal to 2 in.</td>
</tr>
<tr>
<td>Floor to Floor</td>
<td>FF-D-0000 to FF-D-0999</td>
</tr>
<tr>
<td>No Movement</td>
<td>FF-S-0000 to FF-S-0999</td>
</tr>
<tr>
<td>Wall to Wall</td>
<td>WW-D-0000 to WW-D-0999</td>
</tr>
<tr>
<td>No Movement</td>
<td>WW-S-0000 to WW-S-0999</td>
</tr>
<tr>
<td>Floor to Wall</td>
<td>FW-D-0000 to FW-D-0999</td>
</tr>
<tr>
<td>No Movement</td>
<td>FW-S-0000 to FW-S-0999</td>
</tr>
<tr>
<td>Head of Wall</td>
<td>HW-D-0000 to HW-D-0999</td>
</tr>
<tr>
<td>No Movement</td>
<td>HW-S-0000 to HW-S-0999</td>
</tr>
</tbody>
</table>
3.7 FIRE-RESISTIVE JOINT SYSTEMS

A. The fire-resistive joint systems following the end of this section are provided for information purposes as requested by local code authorities. The system descriptions demonstrate typical fire-resistive joint applications, but may not include all applications required. Optional systems may be provided that meet the requirements of Section 07 84 46 – Fire-Resistive Joint Systems.

END OF SECTION 07 84 46
SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
2. Division 08 Section "Glazing" for glazing sealants.
3. Division 09 Section "Gypsum Board" for sealing perimeter joints.
4. Division 09 Section "Tiling" for sealing tile joints.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:

   a. Each kind of sealant and joint substrate indicated.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
      1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ACTION SUBMITTALS
A. Product Data: For each joint-sealant product indicated.
B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
D. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.

1.5 INFORMATIONAL SUBMITTALS
A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
B. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
C. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

D. Field-Adhesion Test Reports: For each sealant application tested.

E. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

E. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.

2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.
B. Special Manufacturer’s Warranty: Manufacturer’s standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 20 years on silicones, 5 years on polyurethanes from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer’s written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Low-Emitting Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services’ "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

E. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
F. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

G. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class and uses.

2.3 LATEX JOINT SEALANTS

A. Latex Sealant Standard: Comply with ASTM C 834 for each product of this description indicated in the Latex Joint-Sealant Schedule at the end of Part 3.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION
A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer’s written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Concrete.
   b. Masonry.
   c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.
   c. Porcelain enamel.
   d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer’s written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

   a. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.
   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:
   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Medium-Modulus Neutral-Curing Silicone Sealant: Provide products complying with the following:
   1. Products: Provide one of the following:
a. 795; Dow Corning.
b. 805; Pecora Corporation.
c. Spectrem 2; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

7. Applications: Use in the following exterior and interior joints, except as noted otherwise:
   a. Joints and recesses formed where frames and subsills of windows, doors, louvers and vents adjoin masonry, concrete or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.
   b. Expansion joints and control joints.
   c. Interior face of expansion joints in exterior concrete or masonry walls where metal expansion joint covers are not required.
   d. Voids where items pass through exterior walls.
   e. Metal reglets, where flashing is inserted into masonry joints, and where flashing is penetrated by coping dowels.
   f. Metal-to-metal joints where sealant is indicated or specified.
   g. Joints between fascias, copings and adjacent walls.
   h. Perimeter of frames at doors, windows and access panels which adjoin exposed interior concrete and masonry surfaces.
   i. Joints of interior masonry walls and partitions which adjoin columns, pilasters, concrete walls and exterior walls unless otherwise detailed.
   j. Joints between edge members for acoustical tile and adjoining vertical surfaces.
   k. Exposed joints within glazed systems and aluminum window framing systems.

B. Mildew-Resistant Silicone Sealant: Provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Products: Provide one of the following:
   a. 786 Mildew Resistant; Dow Corning.
   b. 898 Silicone Sanitary Sealant; Pecora Corporation.
   c. Tremsil 200 Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
6. Applications: Use in the following interior joints located in wet areas, except as noted otherwise:

   a. Joints between toilet fixtures and ceramic tile; joints between shower receptors and ceramic tile; joints formed where nonplaner tile surfaces meet.
   b. Joints formed between tile floors and tile base cove; joints between tile and dissimilar materials; joints occurring where substrates change; joints in vertical surfaces of ceramic tile.
   c. Behind escutcheon plates at valve pipe penetrations and showerheads in showers.

C. Multicomponent or Single Component Pourable (Self Leveling) Urethane Sealant: Provide products complying with the following:

1. Products: Provide one of the following:

   a. NR-200 Urexpans; Urexpans NR-201; Pecora Corporation.
   b. SL 2; SL 1; BASF Building Systems.
   c. Dymeric 240, 240FC, Vulken 45, 45SSL; Tremco, Inc.

2. Type and Grade: M (multicomponent) or single component and P (pourable).
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.


6. Applications: Use in the following exterior and interior horizontal interior joints in traffic areas, except as noted otherwise:

   a. Seats of metal thresholds for exterior doors.
   b. Control and expansion joints in floors, slabs, ceramic tile and walkways.

3.8 LATEX JOINT-SEALANT SCHEDULE

A. Latex Sealant: Provide products complying with the following:

1. Products: Provide one of the following:

   a. AC-20; Pecora Corporation.
   b. Tremflex 834; Tremco.

2. Applications: Use in the following paintable interior joints, except as noted otherwise.

   a. Joints formed where metal interior door and relight frames adjoin gypsum wallboard surface.
   b. Small voids between walls or partitions and adjacent casework, shelving, built-in or surface-mounted equipment and fixtures and similar items.
   c. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.
B. **Acoustical Joint Sealant**: Manufacturer's standard non-sag, 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, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Pecora Corporation; AC-20 FTR.
   b. USG Corporation; SHEETROCK Acoustical Sealant.
   c. Tremco Inc.; Acoustical Sealant.

END OF SECTION 07 92 00
SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
3. Division 09 Sections "Painting" for field painting hollow metal doors and frames.
4. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 ACTION SUBMITTALS

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

B. Shop Drawings: Include the following:

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

C. Other Action Submittals:
1. 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 door hardware schedule.

1.5 QUALITY ASSURANCE

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

B. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

1. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of 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 under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

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

1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Fleming Door Products Ltd.; an Assa Abloy Group company.
5. Kewanee Corporation (The).
6. Republic Builder's Products.
7. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 (ZF120) metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

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

F. Powder-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.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Division 08 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu (1.057 K x sq. m/W) when tested according to ASTM C 1363.

1) Locations: Exterior doors.


a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).

4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.


B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.


1. Frames for Level 3 Steel Doors: 0.067-Inch- (1.7-mm-) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet.

1. Fabricate frames as face welded unless otherwise indicated.
2. Frames for Wood Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
3. Frames for Borrowed Lights: Same as adjacent door frame.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

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 (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, 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 (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPs AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

2.7 LOUVERS

A. Provide louvers for interior doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.
2.9 FABRICATION

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

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.
3. 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 (19 mm) beyond edge of door on which astragal is mounted.

D. 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. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. 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.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:
   
a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      1) Two anchors per jamb up to 60 inches (1524 mm) high.
      2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
      4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.

b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      1) Three anchors per jamb up to 60 inches (1524 mm) high.
      2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.

c. Compression Type: Not less than two anchors in each jamb.

7. Door Silencers: Except on weather-stripped doors, 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.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

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

G. Stops and Moldings: Provide stops and moldings around glazed lites 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 type of glazing and type of installation indicated.

2.10 STEEL FINISHES

A. Prime Finish: Apply manufacturer’s standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
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. For the record, 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. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, 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 ANSI/SDI A250.11.

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-protection-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 glazing 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 plumbness, squareness, 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 are filled with grout containing antifreezing agents.

h. Putty over exposed anchors. Sand and prime for smooth uniform finish.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

5. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

7. 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 (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch (1.6 mm), 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 Standard Steel Doors:

a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).

b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).

c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).

d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Division 08 Section "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 (230 mm) o.c. and not more than 2 inches (50 mm) 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 08 11 13
SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section Includes:
      1. Solid-core doors with wood-veneer faces.
      2. Factory finishing flush wood doors.
      3. Factory fitting flush wood doors to frames and factory machining for hardware.

   B. Related Sections:
      1. Division 07 Section "Door Hardware" for finish hardware.
      2. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

   B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
      1. Indicate dimensions and locations of mortises and holes for hardware.
      2. Indicate dimensions and locations of cutouts.

   C. Samples for Initial Selection: For factory-finished doors.

   D. Samples for Verification:
      1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
      2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
         a. Provide samples for each species of veneer and solid lumber required.
         b. Finish veneer-faced door samples with same materials proposed for factory-finished doors.
3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.4 INFORMATIONAL SUBMITTALS
   A. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE
   A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
   B. Source Limitations: Obtain flush wood doors from single manufacturer.
   C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
      1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
      2. Provide WI-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
   D. Fire-Rated Wood Doors: Doors 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.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Comply with requirements of referenced standard and manufacturer's written instructions.
   B. Package doors individually in plastic bags or cardboard cartons.
   C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS
   A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 WARRANTY
   A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
      1. Failures include, but are not limited to, the following:
a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.

b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.26 mm in a 76.2-mm) span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.


PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Lynden Door.
4. Vancouver Door Company.
5. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.

B. WDMA I.S.1-A Performance Grade: Heavy Duty.

C. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-1.
2. Blocking: Provide wood blocking in particleboard-core doors as follows:

   a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
   b. 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
   c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.

D. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

   1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

   1. Grade: Premium, with Grade A faces.
2. Species: Select white maple.
3. Cut: Plain sliced (flat sliced).
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Exposed Vertical and Top Edges: Same species as faces or a compatible species.
8. Core: Particleboard or Glued wood stave.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.
10. WDMA I.S.1-A Performance Grade: Heavy Duty.

2.4 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.

2.5 FABRICATION

A. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

B. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI catalyzed polyurethane system.
4. Effect: Filled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."
B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.
B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16
SECTION 08 31 13
ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to Division 1 Section "Sustainable Design Requirements – WSSP for Schools" for submittal requirements and formats.

1.2 SUMMARY

A. Section Includes:

1. Access doors and frames for walls and ceilings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.

D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.
2.2 ACCESS DOORS AND FRAMES FOR WALLS ANDceilings

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

1. Jensen Industries; Div. of Broan-Nutone, LLC.
4. Larsen’s Manufacturing Company.
5. Milcor Inc.
6. Nystrom, Inc.

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.


1. Locations: Where required in walls and ceilings.
2. Door: Flush panel with a core of a mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch (0.9 mm).
3. Frame: Minimum 0.060-inch- (1.5-mm-)- thick sheet metal with 1-inch- (25-mm-)- wide, surface-mounted trim.
5. Latch (At secure locations or in rooms not accessible to public or students): Self-latching bolt operated by flush screwdriver.
6. Lock (At locations accessible to students or the public): Manufacturer’s standard key lock.

D. Fire-Rated, Flush Access Doors with Exposed Flanges <Insert drawing designation>:

1. Basis-of-Design Product: [Indicated on Drawings] <Insert manufacturer’s name; product name or designation>.
2. Assembly Description: Fabricate door to fit flush to frame, [with a core of mineral-fiber insulation enclosed in sheet metal] [uninsulated]. Provide self-latching door with automatic closer and interior latch release. Provide manufacturer’s standard-width exposed flange, proportional to door size.
3. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
4. Fire-Resistance Rating: Not less than [that indicated] [that of adjacent construction] [45 minutes] [1 hour] [1-1/2 hours] [2 hours] [3 hours] <Insert requirement>.
5. Temperature-Rise Rating: [450 deg F (250 deg C) at the end of 30 minutes] [250 deg F (139 deg C) at the end of 30 minutes].
6. Uncoated Steel Sheet for Door: [Nominal 0.036 inch (0.91 mm), 20 gage] <Insert thickness>.

   a. Finish: [Factory prime] [Factory finish].

7. Metallic-Coated Steel Sheet for Door: [Nominal 0.040 inch (1.02 mm), 20 gage] <Insert thickness>.

   a. Finish: [Factory prime] [Factory finish].

8. Stainless-Steel Sheet for Door: [Nominal 0.038 inch (0.95 mm), 20 gage] <Insert thickness>.

   a. Finish: [No. 4] [No. 2b].
9. Frame Material: [Same material, thickness, and finish as door] <Insert material, thickness, finish>.
11. Hardware: [Latch] [Lock].

E. Fire-Rated, Flush Access Doors with Concealed Flanges <Insert drawing designation>:

1. Basis-of-Design Product: [Indicated on Drawings] <Insert manufacturer's name; product name or designation>.
2. Assembly Description: Fabricate door to fit flush to frame, [with a core of mineral-fiber insulation enclosed in sheet metal] [uninsulated]. Provide self-latching door with automatic closer and interior latch release. Provide frame with [gypsum board] [plaster] beads for concealed flange installation.
3. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
4. Fire-Resistance Rating: Not less than [that indicated] [that of adjacent construction] [45 minutes] [1 hour] [1-1/2 hours] [2 hours] [3 hours] <Insert requirement>.
5. Temperature-Rise Rating: [450 deg F (250 deg C) at the end of 30 minutes] [250 deg F (139 deg C) at the end of 30 minutes].
6. Uncorroded Steel Sheet for Door: [Nominal 0.036 inch (0.91 mm), 20 gage] <Insert thickness>.
   a. Finish: [Factory prime] [Factory finish].
7. Metallic-Coated Steel Sheet for Door: [Nominal 0.040 inch (1.02 mm), 20 gage] <Insert thickness>.
   a. Finish: [Factory prime] [Factory finish].
8. Stainless-Steel Sheet for Door: [Nominal 0.038 inch (0.95 mm), 20 gage] <Insert thickness>.
   a. Finish: [No. 4] [No. 2b].
9. Frame Material: [Same material, thickness, and finish as door] <Insert material, thickness, finish>.
11. Hardware: [Latch] [Lock].

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

C. Frame Anchors: Same type as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

   1. For concealed flanges with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
   2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
   3. Provide mounting holes in frames for attachment of units to metal or wood framing.
   4. Provide mounting holes in frame for attachment of masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

   1. For cylinder locks, furnish two keys per lock and key all locks alike.

2.5 FINISHES

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

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

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

D. Steel and Metallic-Coated-Steel Finishes:

   1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13
SECTION 08 33 23
OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Electric Service doors.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for miscellaneous steel supports.
2. Division 26 Sections for electrical service and connections for powered operators and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Operation Cycles: Provide overhead coiling door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position. Not less than 20,000. Include tamper proof cycle counter.

1.4 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:

1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.6 CLOSEOUT SUBMITTALS

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

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer’s authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

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

C. 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Basis of this Specification are motorized service doors and manual and motorized counter doors from the Cookeon Company. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Atlas Door; Div. of Clopay Building Products Company, Inc.
2. Cornell Iron Works, Inc.
4. McKee Rolling Steel Door Company, Inc.
5. Overhead Door Corp.
6. Pacific Rolling Doors Co.
7. Raynor.
8. Wayne-Dalton Corp.
9. Windsor Door, a MAGNATRAX Corporation.

2.2 COUNTER DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Counter Door Endlocks: Manufacturer’s standard locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement. Malleable-iron casings galvanized after fabrication, secured to curtain slats with galvanized rivets or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

B. Counter Door Bottom Bar: Manufacturer’s standard continuous channel or tubular shape, either stainless-steel or galvanized extrusions to suit type of curtain slats.
C. Counter Door Curtain Jamb Guides: Fabricate curtain jamb guides of angles or channels and angles of material and finish to match curtain slats, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize noise of travel and removable stops on guides to prevent overtravel of curtain.

D. See Door Schedule at the end of Part 3 for additional information.

2.3 SERVICE DOOR MATERIALS & CONSTRUCTION

A. Endlocks for Service Doors: Malleable-iron casings galvanized after fabrication, secured to curtain slats with galvanized rivets or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

B. Bottom Bar for Service Doors: Consisting of 2 angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; galvanized, stainless-steel, or aluminum extrusions to suit type of curtain slats.

C. Curtain Jamb Guides for Service Doors: Fabricate curtain jamb guides of steel angles or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inch (5-mm) thick galvanized steel sections complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

D. See Door Schedule at the end of Part 3 for additional information.

2.4 HOODS AND ACCESSORIES

A. Hood: Form to act as weatherseal and 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. Provide closed ends for surface-mounted hoods and provide fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sagging.

1. Fabricate hoods for stainless steel doors of minimum 0.028-inch (0.7-mm) thick, stainless steel, complying with ASTM A666.
2. Shape: Square.

B. Push/Pull Handles: For push-up-operated or emergency-operated doors, provide stainless steel lifting handles on each side of door.

C. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.

1. Locking Bars: Full-disc cremone type, both jamb sides operable from inside only.
2. Lock cylinder is specified in Division 8 Section "Door Hardware."

D. Provide safety interlock switch to disengage power supply when door is locked.
2.5 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, welded or 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. (2.5 mm/m) of span under full load.

C. Spring Balance: 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.

2.6 MANUAL DOOR OPERATORS

A. Push-up Counter Door Operation: Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf.

2.7 ELECTRIC DOOR OPERATORS AT SERVICE DOORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycle requirements specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

B. Comply with NFPA 70.

C. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging chain and sprocket operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.


E. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.

F. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, ac or dc.
G. Door-Operator Type: Provide wall-, hood-, or bracket-mounted, overhead-vertical door operator unit consisting of electric motor, belt-reduction drive, and chain and sprocket secondary drive.

H. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors complying with NEMA MG 1; with overload protection; sized to start, accelerate, and operate door in either direction from any position, at not less than 2/5 fps (0.2 m/s) and not more than 1 fps (0.3 m/s), without exceeding nameplate ratings or service factor. Coordinate with Division 11 Section "Common Motor Requirements for Equipment".

1. Type: Polyphase, medium-induction type.
2. Service Factor: According to NEMA MG 1, unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors with building electrical system.
4. Provide open drip-proof-type motor, and controller with NEMA ICS 6, Type 1 enclosure.

I. Remote-Control Station: Provide momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."

1. Provide interior units, full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

J. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

1. Sensor Edge: Provide each motorized door with an automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

K. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

L. Provide electric operators with ADA-compliant audible alarm and visual indicator lights.

2.8 FINISHES, GENERAL

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

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 the 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.

2.9 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

2.10 ALUMINUM FINISHES
A. Mill Finish: Manufacturer’s standard.
B. Clear Anodic Finish: AAMA 611, AA-M12C22A41 Class I, 0.018 mm or thicker.
C. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer’s written instructions for cleaning, conversion coating, application and baking.

2.11 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, and operators at the mounting locations indicated for each door.
C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 STARTUP SERVICE
A. Engage a factory-authorized service representative to perform startup service.
1. Perform installation and startup checks according to manufacturer’s written instructions.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
B. Lubricate bearings and sliding parts as recommended by manufacturer.
C. Adjust seals to provide weathertight fit around entire perimeter.

3.5 DEMONSTRATION

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

3.6 OVERHEAD COILING DOOR SCHEDULE

A. Door Assembly (OCD-1)
   1. Description:
      a. Model No.: FD10-1.
      b. Door Type: Counter.
      c. Material: Final Coat.
      d. Sill Configuration: No Sill.
      e. Locking Device: Concealed Sliding Deadbolt Lock, thumb turn.
      g. Mounting: Face-of-Wall.
      h. Size: See plans and elevations for R.O.
      i. Special Features: Smoke Detector Activated (Fire Ply II MV System).

B. Door Assembly (OCD-2)
   1. Description:
      a. Model No.: FDO-B.
      b. Door Type: Service.
      d. Sill Configuration: No Sill.
      e. Size: See plans and interior elevations for R.O.
      f. Operation: Motor (115, 12, 1/3 HP gearhead-vertical).
      g. Mounting: Between jamb.
      h. Features: Smoke Detector Activated.

END OF SECTION 08 33 23
SECTION 08 33 36
SIDE SLIDING GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Side sliding grille.

B. Related Sections:
   1. Division 5 Section "Metal Fabrications" for support of and blocking for partition tracks, jamb conditions, pocket doors, motor operators, and controls; and for prepunching metal support members.
   2. Division 6 Section "Rough Carpentry" for support of and blocking for partition tracks, jamb conditions, pocket doors, motor operators, and controls.
   3. Division 8 Section "Access Doors and Frames" for access panels to controls of fire-rated folding doors.

1.3 SUBMITTALS

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

B. Shop Drawings: For sliding grilles. Include plans, elevations, sections, details, attachments to other work, clearances required for operation and accessory items. Show blocking.

C. Samples for Verification: For each type of folding door indicated and for each type of exposed finish required, in manufacturer's standard sizes.

D. Product Schedule: For grilles.

E. Qualification Data: For qualified Installer.

F. Product Certificates: For the following, from manufacturer:
   1. Each type of finish for grilles.

G. Operation and Maintenance Data: For grilles to include in maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
   1. Hardware, track, carriers, seals, and other operating components.
1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install grilles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

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

1.6 WARRANTY

A. Side Sliding Grilles shall be warranted for a period of two (2) years from the time of shipment against defect in workmanship and materials.

PART 2 - PRODUCTS

2.1 SIDE SLIDING GRILLES

A. Manufacturers: Basis-of-Design is Cookson Classic "126" side sliding grille. Other manufacturers may be considered if submitted in accordance with Division 1 requirements.

2.2 MATERIALS

A. 2" (51 mm) high truss-like plates at the top and bottom of the closure. Construct of 5/16" diameter vertical rods on 3-1/2" (89 mm) centers linked by flat horizontal bars 1/8" (3 mm) by 5/8" (16 mm) by 73/4" (197 mm). Bars are vertically spaced every 12" (305 mm) with 7/16" (11mm) diameter sleeves over alternating rods.

B. Aluminum is to be 6063 aluminum alloy with T-5 temper.

2.3 LOCKING:

A. Members are to be vertical stiles fabricated from rectangular tubing 1.3" (33 mm) x 2.4" (62 mm). Members using floor bolts include dust free, stainless top floor sockets.

B. Lead and trailing end members are to be cylinder controlled lock stiles with self-adjusting, cold rolled steel floor bolts and top bolts through the top of the track into the support.

C. Intermediate locking members with cold rolled steel floor bolts are supplied for (up to) every 10'-0" (3048 mm) of curtain.
2.4 TRACK:
   A. Overhead track is to be 1.3" (33 mm) wide x 1.8" (46 mm) high and is to accept 1-1/8" (29 mm) diameter roller trolleys. Rollers are to bear on 0.27" (7 mm) thick aluminum surface within the track.

2.5 FINISH:
   A. Standard factory finishes are to be: 0.0004" (10 micron) clear anodizing.

2.6 WEIGHT AND STACKING:
   A. Grille weights are to be expressed in lbs./sq. ft. and kg/sq.m of clear opening: Classic 126 - 1.2 lbs./sq. ft. (5.9 kg/sq.m).
   B. Minimum stacking shall be 1.05'/linear foot of opening plus 3.5" for each locking member or 87.5 mm/meter of opening plus 89 mm per locking member.
   C. Grille support must be able to carry the weight of a fully stacked door at any point along its length. Support is to carry the total weight in the total stacking.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of folding doors.
   B. Verify that headers are level with finished floor to within plus or minus 1/16-inch (1.6-mm) tolerance over the length of opening.
   C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
   A. Preparation and Examination: Contractor shall make structural or other preparation of the opening to receive track and grille, provide finish or trim to the opening, construct finish or trim to the opening and construct storage pockets as necessary. Site preparations are to be detailed by approved shop drawings.
   B. Examine all conditions under which grilles are to be installed. Notify contractor of unsatisfactory conditions.
   C. Verify track layout and grille dimensions, especially the finished floor (or counter) to the underside of the support dimensions, by actual measurements.
   D. Install in accordance with the manufacturer's shop drawings and instructions.
3.3 Adjusting

A. Adjust units as necessary to ensure smooth, quiet operation without warping or binding. Adjust hardware to function smoothly. Confirm that latches engage accurately and securely without forcing or binding.

END OF SECTION 08 33 36
SECTION 08 41 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1.1 SUMMARY
A. Exterior and interior storefront framing.
B. Storefront framing for window walls.
C. Exterior and interior manual-swing entrance doors and door-frame units.

1.2 PERFORMANCE REQUIREMENTS
A. Structural Performance:
   1. Wind Loads: As indicated on Drawings.
   2. Seismic Loads: As indicated on Drawings.
B. Deflection of Framing Members:
   1. Deflection Normal to Wall Plane: Limited to L/175.
   2. Deflection Parallel to Glazing Plane: Limited to L/360 or 1/8 inch (3.2 mm), whichever is smaller.

1.3 WARRANTY
A. Materials and Workmanship: Two years.
B. Finish: 10 years.

1.4 MATERIALS
A. Aluminum: Alloy and temper recommended by manufacturer.
B. Steel reinforcement.

1.5 FRAMING SYSTEMS
A. Basis-of-Design Product: Kawneer "451T".
B. Framing Members: Manufacturer's standard extruded-aluminum framing members.
   2. Glazing System: Comply with requirements in Division 8 Section "Glazing".
   3. Glazing Plane: As indicated.
C. Brackets and reinforcements.
D. Fasteners and accessories.
E. Concrete and masonry inserts.
F. Concealed Flashing: 0.018-inch- (0.457-mm-) thick stainless steel.
G. Framing system gaskets and sealants.

1.6 GLAZING SYSTEMS
A. Glazing: As specified in Division 08 Section "Glazing."
B. Glazing gaskets.
C. Spacers and setting blocks.
D. Bond-breaker tape.
E. Glazing Sealants:
   1. Structural sealant.
   2. Weatherseal sealant.

1.7 ENTRANCE DOOR SYSTEMS
A. Entrance Doors:
   1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness "Tuff-Line" 2-Inch (50.8-mm) overall thickness.
   2. Door Design: Wide stile.
   3. Glazing stops and gaskets.
B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

1.8 ALUMINUM FINISHES
A. Aluminum Finishes: High-performance organic (three coats).

1.9 ENTRANCE DOOR HARDWARE SETS
A. See Division 8 Section "Door Hardware."

END OF SECTION 08 41 13
SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Field-glazed aluminum curtain-wall assemblies.

B. Related Sections:
   1. Division 8 Section "Aluminum Framed Entrances and Storefronts" for doors and venting windows.

1.3 PERFORMANCE REQUIREMENTS
A. General Performance: Comply with performance requirements specified, as determined by testing manufacturer's standard of structural-sealant-glazed curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Structural-sealant-glazed curtain walls shall withstand movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Noise or vibration created by wind and thermal and structural movements.
      d. Loosening or weakening of fasteners, attachments, and other components.
      e. Failure of operating units.

B. Delegated Design: Design structural-sealant-glazed curtain walls, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Loads:
   1. Wind Loads: As indicated on Drawings.
D. Structural-Test Performance: Provide structural-sealant-glazed curtain walls tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.
   a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.
3. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to 2 times the length of cantilevered member divided by 175.

F. Seismic Performance: Structural-sealant-glazed curtain walls shall withstand the effects of earthquake motions determined according to as noted on the drawings.

G. Story Drift: Accommodate design displacement of adjacent stories indicated.

1. Design Displacement: As indicated on Drawings.
2. Test Performance: Meets criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.

H. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft. (480 Pa).

I. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft. (480 Pa).

1. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.

J. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
2. Test Interior Ambient-Air Temperature: 75 deg F (24 deg C).
3. **Test Performance:** No buckling, stress on glass, sealant failure, or excess stress on framing, anchors, and fasteners and no reduction of performance when tested according to AAMA 501.5.

**K. Energy Performance:** Structural-sealant-glazed curtain walls shall have certified and labeled energy performance ratings according to NFRC.

1. **Thermal Transmittance (U-Factor):** Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. \( \times \) h \( \times \) deg F \( (2.55 \text{ W/sq. m} \times \text{K}) \) as determined according to NFRC 100.

2. **Air Infiltration:** Maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area as determined according to ASTME283 at a minimum static-air-pressure differential of 0.24 lbf/sq. ft. (300 Pa).

3. **Condensation Resistance:** Fixed glazing and framing areas shall have an NFRC-certified CR rating of no less than 45 as determined according to NFRC 500

**L. Structural Sealant:** Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed curtain walls without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.

2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

**M. Structural-Sealant Joints:**

1. Designed to carry gravity loads of glazing.

2. Designed to produce tensile or shear stress of less than 20 psi (138 kPa).

3. Design reviewed and approved by structural-sealant manufacturer.

**1.4 SUBMITTALS**

**A. Product Data:** For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

**B. Shop Drawings:** For structural-sealant-glazed curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.

2. Include full-size isometric details of each vertical-to-horizontal intersection of structural-sealant-glazed curtain walls, showing the following:

   a. Joinery, including concealed welds.
   b. Anchorage.
   c. Expansion provisions.
   d. Glazing.
   e. Flashing and drainage.
   f. Resubmit Shop Drawings with changes made to details of structural-sealant-glazed curtain walls, to successfully complete preconstruction testing.
C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.
   5. Flashing and drainage.

F. Delegated-Design Submittal: For structural-sealant-glazed curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

G. Qualification Data: For qualified Installer.

H. Seismic Qualification Certificates: For structural-sealant-glazed curtain walls, accessories, and components, from manufacturer.
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

I. Welding certificates.

J. Energy-Performance Certificates: For structural-sealant-glazed curtain walls, accessories, and components, from manufacturer.

K. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency, for structural-sealant-glazed curtain walls, indicating compliance with performance requirements.

L. Source quality-control reports.

M. Field quality-control reports.

N. Maintenance Data: For structural-sealant-glazed curtain walls to include in maintenance manuals. Include ASTM C 1401 recommendations for postinstallation-phase quality-control program.

O. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Product Options: Information on Drawings and in Specifications establishes requirements for assemblies' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

C. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of structural-sealant-glazed curtain walls.

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

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

E. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for structural-sealant-glazed curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Assembly Warranty: Standard form in which Installer agrees to repair or replace components of structural-sealant-glazed curtain walls that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

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

   a. Structural failures including, but not limited to, excessive deflection.
   b. Noise or vibration created by wind and thermal and structural movements.
   c. Deterioration of metals and other materials beyond normal weathering.
   d. Water penetration through fixed glazing and framing areas.
   e. Failure of operating components.

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

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

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

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

2. Warranty Period: 20 years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer North America "1600 Wall, System 2" butt and exterior glazed or comparable product by one of the following:

1. Arcadia, Inc.
2. EFCO Corporation.
3. TRACO.
4. United States Aluminum.
5. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
7. YKK AP America Inc.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING

A. Framing Members: Manufacturer's 6" and 7-1/2" formed- or extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
C. Anchors: Three-way adjustable anchors, with minimum adjustment of 1 inch (25.4 mm), that accommodate fabrication and installation tolerances in material and finish and are compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

D. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

E. Framing Sealants: Manufacturer's standard sealants with VOC content of 250g/L or less when calculated according to 40 CFR 59, Subpart D (EPA method 24).

2.4 GLAZING

A. Glazing: Comply with Division 8 Section "Glazing."

B. Glazing Gaskets, Spacers, Setting Blocks, Sealant Backings, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types compatible with sealants and suitable for joint movement and assembly performance requirements.

C. Glazing Gaskets, Spacers, Setting Blocks, Sealant Backings, and Bond Breakers: As specified in Division 8 Section "Glazing."

D. Glazing Sealants: For structural-sealant-glazed curtain walls, as recommended by manufacturer for joint type, and as follows:

1. Structural Sealant: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.

   a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

   b. Color: As selected by Architect from manufacturer's full range of colors.

2. Weatherseal Sealant: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed curtain-wall manufacturers for this use.

   a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

   b. Color: Matching structural sealant.

2.5 ALUMINUM COMPOSITE PANELS

A. Product: Reynobond ACM.

B. Description:
1. Thickness: .015".
2. Finish: Matching curtain-wall framing.
3. Texture: Smooth.
4. Backing Sheet: 1/8-inch- (3.2-mm-) thick, tempered hardboard.
4. Thermal Insulation Core: Manufacturer's standard extruded-polystyrene board.
5. Surface-Burning Characteristics: For exposed interior surfaces of panels, when tested according to ASTM E 84 as follows:
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2.6 OPERABLE UNITS

A. Doors and Venting Windows: Comply with Section 08411 "Aluminum-Framed Entrances and Storefronts."

2.7 SUN SHADE

A. Manufacturer: Kawneer.
B. Product: 1600 Sunshade.
C. Description:
   1. First Floor:
      a. Outrigger: Straight-Square.
      b. Louvers: Airfoil.
      c. Fascia: Rectangular.
   2. Second Floor:
      a. Outrigger: Wedge.
      b. Louvers: Circular.
      c. Fascia: Angular.

2.8 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.
B. Cleaning Agent and Cloth: As recommended by structural-sealant manufacturer.
2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
6. Provisions for field replacement of glazing from exterior or interior as indicated. Include accommodations for using temporary support device (dutchman) to retain glazing in place while sealant cures.
7. Components curved to indicated radii.
8. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within structural-sealant-glazed curtain wall to exterior.

D. Factory-Assembled Frame Units:

1. Rigidly secure nonmovement joints.
2. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
3. Preparation includes, but is not limited to, cleaning and priming surfaces.
4. Seal joints watertight unless otherwise indicated.
5. Install glazing to comply with requirements in Division 8 Section "Glazing."

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and 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.

1. Color and Gloss: As indicated on Finish Legend Section 09000.

2.11 SOURCE QUALITY CONTROL

A. Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.
PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 INSTALLATION

A. General:

1. Comply with manufacturer’s written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmoving joints.
5. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and impediments to movement of joints.
6. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within structural-sealant-glazed curtain walls to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Division 8 Section “Glazing.” Prepare surfaces that will contact structural sealant according to sealant manufacturer’s written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

G. Install weatherseal sealant according to Division 7 Section "Joint Sealants" and according to sealant manufacturer’s written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install to comply with the following nonaccumulating maximum tolerances:
1. Plumb: 1/8 inch in 10 feet (3 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).
2. Level: 1/8 inch in 20 feet (3 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
   c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
4. Location: Limit variation from plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/2 inch (12.7 mm) over total length.

END OF SECTION 08 44 13
SECTION 08 53 13
VINYL WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes fixed and operable vinyl-framed windows.
   1. Casement (Base Bid).
   2. Tilt and Turn (Alternate Bid).

1.3 DEFINITIONS

A. Performance class designations according to AAMA/WDMA 101/I.S.2/NAFS:
   1. LC: Light Commercial.

B. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
   1. Design pressure number in pounds force per square foot (pascals) used to determine the structural test pressure and water test pressure.

C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.

D. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide vinyl windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of test size indicated below:
   2. Size indicated on Drawings.

B. Structural Performance: Provide vinyl windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural Test:
1. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 m) above grade, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.

   a. Basic Wind Speed: 85 mph (38 m/s).

C. Windborne-Debris Resistance: Provide glazed windows capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed windows identical to those specified, according to ASTM E 1886 and testing information in ASTM E 1996 and requirements of authorities having jurisdiction.

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of vinyl window indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:

1. Mullion details, including reinforcement and stiffeners.
2. Joinery details.
4. Flashing and drainage details.
5. Weather-stripping details.
7. Window cleaning provisions.
8. For installed products indicated to comply with design loads, include structural analysis data prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of vinyl windows, and used to determine structural test pressures and design pressures from basic wind speeds indicated.

C. Samples for Verification: For vinyl windows and components required, prepared on Samples of size indicated below.

1. Main Framing Member: 12-inch- (300-mm-) long, full-size sections of window frame.
2. Window Corner Fabrication: 12-by-12-inch- (300-by-300-mm-) long, full-size window corner including full-size sections of window frame with factory-applied color finish, weather stripping, and glazing.
3. Hardware: Full-size units with factory-applied finish.
4. Weather Stripping: 12-inch- (300-mm-) long sections.
5. Ventilation.

D. Qualification Data: For Installer and manufacturer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, class, grade, and size of vinyl window. Test results based on use of downsized test units will not be accepted.

F. Maintenance Data: For operable window sash, operating hardware, weather stripping and finishes to include in maintenance manuals.

G. Warranty: Special warranty specified in this Section.
1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer acceptable to vinyl window manufacturer for installation of units required for this Project.

1. Installer's responsibilities include providing professional engineering services needed to assume engineering responsibility.

B. Manufacturer Qualifications: A manufacturer capable of fabricating vinyl windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

C. Source Limitations: Obtain vinyl windows through one source from a single manufacturer.

D. Product Options: Information on Drawings and in Specifications establishes requirements for vinyl windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

E. Product Options: Drawings indicate size, profiles, and dimensional requirements of vinyl windows and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements." Do not modify size and dimensional requirements.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.


1. Provide AAMA-certified vinyl windows with an attached label.

G. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify vinyl window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating vinyl windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
   a. Failure to meet performance requirements.
   b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
   c. Faulty operation of movable sash and hardware.
   d. Deterioration of vinyl, other materials, and finishes beyond normal weathering.
   e. Failure of insulating glass.

2. Warranty Period:
   a. Window: 10 years from date of Substantial Completion.
   b. Glazing: 10 years from date of Substantial Completion.
   c. Vinyl Finish: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Cascade vinyl window. Subject to compliance with Division 1 Specifications, products from other manufacturer’s will be considered.

2.2 MATERIALS

A. Vinyl Extrusions: Rigid (unplasticized) hollow PVC extrusions, formulated and extruded for exterior applications, complying with AAMA/WDMA 101/I.S.2/NAFS and the following:
   1. PVC Resins: 100 percent virgin resin.
   2. PVC Formulation: High impact, low heat buildup, lead free, nonchalking, and color and UV stabilized.
   3. Extrusion Wall Thickness: Not less than 0.060 inch (1.5 mm).
   4. Multichamber Extrusions: Profile designed with multichambers between interior and exterior faces of the extrusions.

B. Vinyl Trim and Glazing Stops: Material and finish to match frame members.

C. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with vinyl window members, cladding, trim, hardware, anchors, and other components.
   1. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
E. Reinforcing Members: Aluminum, or nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

F. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action, and for complete concealment when vinyl window is closed.


   1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

H. Replaceable Weather Seals: Comply with AAMA 701/702.

2.3 WINDOW

A. Window Type: Casement (Base Bid), Tilt & Turn (Alternate Bid).

B. AAMA/WDMA Performance Requirements: Provide vinyl windows of performance indicated that comply with AAMA/WDMA 101/11.S.2/NAFS unless more stringent performance requirements are indicated.

   1. Performance Class and Grade: LC 35.
   2. Performance Class: LC.

C. Thermal Transmittance: Provide vinyl windows with a whole-window, U-factor maximum indicated at 15-mph (24-km/h) exterior wind velocity and winter condition temperatures when tested according to NFRC 100.

   1. U-Factor: 0.40 Btu/sq. ft. x h x deg F (2.3 W/sq. m x K) or less.

D. Solar Heat-Gain Coefficient (SHGC): Provide vinyl windows with a whole-window SHGC maximum of 0.32, determined according to NFRC 200 procedures.

E. Sound Transmission Class (STC): Provide glazed windows rated for not less than 34 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

F. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/11.S.2/NAFS, Air Infiltration Test.

   1. Maximum Rate: 0.03 cfm/sq. ft. of area at an inward test pressure of 1.57 lbf/sq. ft. (75 Pa).
G. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equalling that indicated, when tested according to AAMA/WDMA 101/I.S.2/NAFS, Water Resistance Test.

1. Test Pressure: 5.26 psf.

2.4 GLAZING


2.5 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with vinyl, designed to smoothly operate, tightly close, and securely lock vinyl windows, and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals. Where exposed, provide solid bronze extruded, cast, or wrought aluminum die-cast zinc with special coating finish or nonmagnetic stainless steel.

B. Lock: Cam-Action Lock with finish matching vinyl.

2.6 INSECT SCREENS

A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with window frame. Locate screens on inside and outside of window and provide for each operable exterior sash or ventilator.


B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners and removable PVC spline/anchor concealing edge of frame.

1. Aluminum Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet with minimum wall thickness as required for class indicated.
2. Finish: Manufacturer's standard.

C. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.

1. Wire-Fabric Finish: As selected by Architect from Manufacturer's standard colors.

2.7 FABRICATION

A. Fabricate vinyl windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
1. Welded Frame and Sash/Ventilator Corners: Miter-cut and fusion welded.

B. Fabricate vinyl windows that are reglazable without dismantling sash or ventilator framing.

C. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator, unless otherwise indicated.

D. Mullions: Provide mullions and cover plates as shown, compatible with window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units. Provide manufacturer's standard finish to match window units.

E. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch (1.6-mm) thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Provide manufacturer's standard finish to match window units. Provide subframes capable of withstanding design loads of window units.

F. Hardware: Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant steel reinforcement complying with requirements for reinforcing members, or do both.

G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

2.8 VINYL FINISHES

A. Integral Finish and Color: Uniform, solid, homogeneous interior and exterior.

1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather-tight window installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.

3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

4. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

D. Separate aluminum and other corroding surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

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

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION 08 53 13
SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the following:

1. Commercial door hardware for the following:
   a. Swinging doors.
   b. Other doors to the extent indicated.

2. Electrified door hardware.

B. Related Sections include the following:

1. Section 08110 – Steel Doors and Frames
2. Section 08411 – Aluminum-Framed Entrances and Storefronts
3. Section 16660 – Access Control and Security System

C. Products to be installed by Owner. Coordinate type and quantities required with Owner.

   1. Final replacement cores and keys. All locksets to be furnished with construction cores for use during construction. All final cores and keying to be provided by the Owner.

1.3 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, door fabrication templates, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Power, signal, and control wiring. The following shall be included as a minimum:
   a. System schematic.
   b. Point to point wiring diagrams.
   c. Riser diagram.
   d. Elevation view of each door

2. Detail interface between the electrified door hardware and the access control and security system.

3. Descriptions/details of preparations required for frames to accept hardware. Coordinate with frame manufacturer/supplier.

C. Product Certificates:
1. Certify that the door hardware approved for use on labeled fire doors complies with the listed fire door assemblies.

D. Door Hardware Schedule: Prepared by or under the supervision of the supplier. Coordinate the final Door Hardware Schedule with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.

1. Format: Use the same scheduling sequence, door numbers, etc., as found in the Contract Documents.

2. Organization: Organize the schedule into door hardware groups indicating doors by number, location and complete designations of every item required for each door or opening.

   a. Organize door hardware groups in same order as in the Door Hardware Schedule at the end of Part 3 of this Specification Section.

3. Content: Include the following information in each group:

   a. Door number
   b. Door location (i.e. Room 106 from Room 101)
   c. Door and frame type and size
   d. Description of item (i.e. Hinges, Lock, etc.)
   e. Quantity required for each door opening
   f. Manufacturer and Model Number of each item
   g. Type, style, function, size, label, hand and finish of each item
   h. Fastenings and other pertinent information
   i. Description of each electrified door hardware function, including location, sequence of operation, and interface with the access/security system. Coordinate sequence of operation with the Security system to assure that the hardware is correct for the intended opening, i.e. electric strike vs electric lock, power transfer devise required, device's fail condition, etc.

4. Submittal Sequence: Submit the final Door Hardware Schedule at the earliest possible date, particularly where approval of the hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include all pertinent information essential to the coordinated review of the Door Hardware Schedule.

E. Maintenance Data: Include specific manufacturer's literature, exploded parts views, etc., for each type of door hardware to include in the operations and maintenance manuals as specified in Section 01770.

F. Warranties: Special warranties specified in this section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer, approved by the hardware manufacturer, who has completed door hardware installations similar in material, design and extent to that indicated for this Project and whose work has resulted in successful installations as evidenced by referrals from previous project Owner's maintenance personnel.

B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity who is or employs a qualified Architectural Hardware Consultant, available during
the course of the Work to consult with Contractor, Architect and Owner about door hardware and keying.

C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

D. Regulatory Requirements: Comply with provisions of the following:

1. Comply with accessibility requirements of the Americans with Disabilities Act (ADA) "Accessibility Guidelines for Buildings and Facilities (ADAAG)," as follows:
   a. Handles, pulls, latches, locks and other operating devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching or twisting of the wrist.
   b. Door closers: Comply with the following maximum opening-force requirements:
      1) Interior hinged doors – 5 lbf applied perpendicular to the door.
      2) Fire doors: Minimum opening force allowable by authorities having jurisdiction.
   c. Thresholds: Not more than ½-inch total height. Bevel raised thresholds with a slope of not more than 1:2.

2. NFPA 101: Comply with the following for means of egress doors.
   a. Latches, locks and exit devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool or special knowledge for operation.
   b. Door closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.

3. Electrified door hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

E. Fire Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated.

1.5 PREINSTALLATION CONFERENCE

A. Conduct a preinstallation conference at the project site complying with the requirements of Section 01039 Coordination and Meetings. Review methods and procedures related to installation of hardware including, but not limited to, the following:
   1. Review sequence of operation and interface of electrified hardware with Access/Security system.
   2. Review and modify if necessary the construction schedule to reflect the work effort required to install, adjust, clean, and test the hardware.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
B. Tag each item or package separately with identification related to the groupings in the final Door Hardware Schedule. Include basic installation instructions with each item.

C. Deliver keys and permanent cores to the Owner by registered mail. Locksets to be delivered to the site with temporary construction cores.

1.7 COORDINATION

A. Coordinate layout and installation of recessed hardware with building construction. Cast anchoring inserts into concrete. See Specification Section 03300 “Cast in Place Concrete” for concrete, reinforcement and formwork requirements.

B. Templates: Obtain and distribute to the parties involved templates for doors, frames and other work specified to be factory prepared for installing door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to related systems. Examples include but are not limited to door hold open devices connected to the building fire alarm system, and electric strikes connected to the Access/Security system.

D. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications are required to reuse existing door hardware, field verify the existing conditions and coordinate the installation to suit.

1.8 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within 3 years of substantial completion. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking or breakage.
2. Faulty operation of operators and door hardware.
3. Deterioration of metals, metal finishes and other materials beyond normal wear.

C. Warranty shall last three years from the date of substantial completion, unless manufacturer's warranty is longer. Shorter manufacturer's warranties shall be extended by the Contractor.

1.9 MAINTENANCE TOOLS

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance and removal and replacement of door hardware.
PART 2 - PRODUCTS

2.1 GENERAL

A. Provide door hardware for each door to comply with requirements in this Section, the Door Hardware Schedule at the end of this section, and required to meet the operational sequence as specified herein and/or other Contract Documents.

B. Requirements for design, grade, function, finish, size and other distinctive characteristics of each type of door hardware are as indicated in the Door Hardware Schedule at the end of this Section. Products are identified by naming manufacturer's products for each door hardware type required for the purpose of establishing minimum requirements. Where only one manufacturer is listed for a particular item(s), there are no substitutions allowed. Refer to Section 01600.

2.2 BUTT HINGES

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

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ives</td>
<td>5BB1HW NRP</td>
</tr>
<tr>
<td>Hager Companies (HAG)</td>
<td>BB1168 NRP</td>
</tr>
<tr>
<td>McKinney Products Company (MCK)</td>
<td>T4A3386 NRP</td>
</tr>
<tr>
<td>Stanley (ST)</td>
<td>FBB179NRP</td>
</tr>
</tbody>
</table>

B. Sizes: Size and quantity of hinges required per door leaf:

<table>
<thead>
<tr>
<th>Door Size</th>
<th>Hinge Size</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 36&quot; wide X up to 7&quot; tall 1 3/8&quot; thick</td>
<td>4½ ea</td>
<td>3 ea</td>
</tr>
<tr>
<td>Up to 36&quot; wide X up to 7&quot; tall 1 3/4&quot; thick</td>
<td>4½</td>
<td>3 ea</td>
</tr>
<tr>
<td>42&quot; wide doors X up to 7&quot; tall</td>
<td>5&quot;3 ea</td>
<td></td>
</tr>
<tr>
<td>48&quot; wide doors X up to 7&quot; tall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7' add 1 hinge per each 24&quot; of height</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. Types:

1. Exterior hinges shall be heavy-duty, ball bearing, stainless-steel with non-removable stainless-steel pin.
2. Interior hinges shall be heavy-duty, ball bearing, steel, stainless-steel, or brass, with matching non-removable pins. Finish type shall match other door hardware, and/or as called out in the hardware schedule.

D. Electrified Hinges/Electrical Power Transfer:

1. Wherever hardware is electrified, and requires that the power be transferred across the hinge, power shall be transferred from the frame to the door utilizing a Von Duprin EPT-2 or approved equal power transfer unit. Electrified hinges are not acceptable.

E. Fasteners: Comply with the following (finish shall match hardware):

1. Threaded-to-the-head Wood Screws: for fire rated wood doors
2. Countersunk Phillips head screws: Provide wood screws for wood doors
3. For metal doors and frames, install machine screws into drilled and tapped holes.
2.3 SPRING HINGES

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

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanley (ST)</td>
<td>422313-2060-R</td>
</tr>
<tr>
<td>Bommer</td>
<td>4311</td>
</tr>
<tr>
<td>Hager Companies (HAG)</td>
<td>1150</td>
</tr>
<tr>
<td>McKinney Products Company (MCK)</td>
<td>1502</td>
</tr>
</tbody>
</table>

B. Sizes: Size and quantity of hinges required per door leaf:

<table>
<thead>
<tr>
<th>Door Size</th>
<th>Hinge Size</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 36&quot; wide X up to 7' tall 1 3/8&quot; thick</td>
<td>4&quot;</td>
<td>3 ea</td>
</tr>
<tr>
<td>Up to 36&quot; wide X up to 7' tall 1 3/4&quot; thick</td>
<td>4 1/2</td>
<td>3 ea</td>
</tr>
</tbody>
</table>

C. Types:

1. Hinges shall be heavy-duty, ball bearing, steel, stainless-steel, or brass. Finish type shall match other door hardware, and/or as called out in the hardware schedule.

D. Electrified Hinges/Electrical Power Transfer:

1. Wherever other hardware is electrified, and requires that the power be transferred across the hinge, power shall be transferred from the frame to the door utilizing a Von Duprin EPT-2 or approved equal power transfer unit. Electrified hinges are not acceptable.

E. Fasteners: Comply with the following (finish shall match hardware):

1. Threaded-to-the-head Wood Screws: for fire rated wood doors.
2. Countersunk Phillips head screws: Provide wood screws for wood doors.
3. For metal doors and frames, install machine screws into drilled and tapped holes.

2.4 PIVOT HINGES

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

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hager Companies (HAG)</td>
<td>550</td>
</tr>
<tr>
<td>McKinney Products Company (MCK)</td>
<td>4007</td>
</tr>
<tr>
<td>Stanley (ST)</td>
<td>DAP-3</td>
</tr>
</tbody>
</table>

B. Electrified Hinges/Electrical Power Transfer:

1. Wherever hardware is electrified, and requires that the power be transferred across the hinge, power shall be transferred from the frame to the door utilizing a Von Duprin EPT-2 or approved equal power transfer unit. Electrified hinges are not acceptable.

C. Fasteners: Comply with the following (finish shall match hardware):
1. Threaded-to-the-head Wood Screws: for fire rated wood doors
2. Phillips flat head screws: Provide wood screws for wood doors
3. For metal doors and frames, install machine screws into drilled and tapped holes.

2.5 CONTINUOUS HINGES

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

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pemco (PEM)</td>
<td>CFM83HD</td>
</tr>
<tr>
<td>Hager Companies (HAG)</td>
<td>780HD</td>
</tr>
<tr>
<td>McKinney Products Company (MCK)</td>
<td>MCK12HD</td>
</tr>
</tbody>
</table>

B. Electrified Hinges/Electrical Power Transfer:

1. Wherever hardware is electrified, and requires that the power be transferred across a continuous hinge, power shall be transferred from the frame to the door utilizing an electrified continuous hinge. Example: the Pemko CFM hinge would become a CFM—with CC8 at a given distance from the top or bottom with the hand of the door called out. Von Duprin EPT-2 can be used.

2.6 LOCKS AND LATCHES

A. General:

1. Unless specified to be electrified, provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware unless otherwise indicated.

2. Locks to be prepared for Best IC 7 pin interchangeable core.

3. Trim: Provide lever handles on all locks unless specifically indicated to be knob.

4. Backset: 2-3/4 inch, unless otherwise indicated and approved by the A/E.

B. Mechanical Locks and Latches:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Schlage Lock Company (SCH).

2. Types and functions:
   a. Mortise Locks:

      1) Locks shall be Schlage L Series with 06 Lever handles, finish and function as called out in the hardware schedule at the end of this section.

      2) Functions:

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Schlage No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F01</td>
<td>Passage Latch</td>
<td>L9010</td>
</tr>
<tr>
<td>F04</td>
<td>Office Lock</td>
<td>L9050</td>
</tr>
<tr>
<td>F05</td>
<td>Classroom Lock</td>
<td>L9070</td>
</tr>
<tr>
<td>F07</td>
<td>Storeroom Lock</td>
<td>L9080</td>
</tr>
<tr>
<td>F09</td>
<td>Key both sides</td>
<td>L9060</td>
</tr>
<tr>
<td>F17</td>
<td>Double Cylinder</td>
<td>L9462</td>
</tr>
<tr>
<td>F18</td>
<td>Single Cylinder w/thumbturn</td>
<td>L9460</td>
</tr>
</tbody>
</table>
b. Bored Locks:

1) Locks shall be Schlage D Series with Rhodes Lever handles, finish and function as called out in the hardware schedule at the end of the section.

2) Functions:

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Schlage No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F75</td>
<td>Passage Latch</td>
<td>ND10S</td>
</tr>
<tr>
<td>F82</td>
<td>Office Lock</td>
<td>ND53BD</td>
</tr>
<tr>
<td>F84</td>
<td>Classroom Lock</td>
<td>ND70BD</td>
</tr>
<tr>
<td>F07</td>
<td>Storeroom Lock</td>
<td>ND80BD</td>
</tr>
<tr>
<td>F80</td>
<td>Key both sides</td>
<td>ND72BD</td>
</tr>
<tr>
<td>F17</td>
<td>Double Cylinder</td>
<td>L9462</td>
</tr>
<tr>
<td>F18</td>
<td>Single Cylinder w/ thumbturn</td>
<td>L9460</td>
</tr>
</tbody>
</table>

C. Electrified Locks and Latches:

1. Hard-wired locks and latches:

   a. Unless specifically identified otherwise, all electrified locks and latches shall be wired via other security system components to the building emergency power system, and shall fail-secure to the locked position upon loss of power.

   b. Provide a j-box with in an accessible location (preferably above the room ceiling) as near to the door/frame containing the lock/latch assembly as possible.

   c. Provide raceway (3/4" EMT, unless noted otherwise) from the power source to this j-box and then into the hollow metal frame when available.

   1) For locksets, continue the wiring through a power transfer device, through raceway in the door and terminate at the lockset per the manufacturer's directions.

   2) For latches, unless the frame is prepared with an approved raceway, continue with raceway in the wall to the latch assembly.

   3) For installations without hollow metal frames, provide approved raceway and j-box(s) at the connection to the power transfer device, or latch location unless the device is provided with an integral j-box or other approved termination point. Where j-boxes are used, they shall be located on the non-public side of the door opening, secured to the wall in a location not accessible by the general public and provided with security tamper-proof torque style screws.

d. Types and functions:

   1) Mortise Locks:

      a) Locks shall be Schlage L Series with 06 Lever handles, finish and function as called out in the hardware schedule at the end of this section.

      b) Functions:

         | ID | Description            | Schlage No. |
         |----|------------------------|-------------|
         | FE01| Electrically Locked    | L9080EL     |
2) Bored Locks:

a) Locks shall be Schlage D Series with Rhodes Lever handles, finish and function as called out in the hardware schedule at the end of the section.

b) Functions:

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Schlage No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FE01</td>
<td>Electrically Locked</td>
<td>ND80BDEI</td>
</tr>
<tr>
<td>FE02</td>
<td>Electrically Unlocked</td>
<td>ND80BDEU</td>
</tr>
</tbody>
</table>

2. Self contained electronic locks and latches:

a. Internal, battery-powered, self contained locks consisting of complete lockset with card reader which activates release mechanism so handle may be rotated which retracts latchbolt. Provide key override function and LED low battery and unlocked indicators. Provide ability to program lock.

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

1) Schlage/Locknetics.

3. Special Use Exit Alarm Locks:

a. Surface mounted deadbolts or latchbolts; with battery-powered alarm that sounds when unauthorized use of door occurs; housed in a metal case. Provide red and white pressure sensitive lettering reading "PUSH TO OPEN—ALARM WILL SOUND".

b. Units to be provided with auxiliary contacts and/or relays to allow for triggering of cameras and/or other devices. The auxiliary contacts and/or relays shall activate at the start of the exit cycle, when the exit device is pushed, and not when the lock or latch is released.

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

1) Von Duprin
2) Detex.

4. Electrified Strikes:

a. Electrified strike mechanisms: Strike mechanisms which momentarily unlock when a reader card is swiped in a card reader and/or an exit sensing device (ir, motion, or push button) opens or closes a relay.

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

1) Von Duprin (VD).
2.7 DOOR BOLTS

A. Flush Bolts Automatic – provide with dust proof strikes and coordinators:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hager Companies (HAG)</td>
<td>292D</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS)</td>
<td>559</td>
</tr>
<tr>
<td>Trimco (TBM)</td>
<td>3810</td>
</tr>
</tbody>
</table>

B. Flush Bolts Manual – provide with dust proof strikes:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hager Companies (HAG)</td>
<td>282D</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS)</td>
<td>457</td>
</tr>
<tr>
<td>Trimco (TBM)</td>
<td>3917</td>
</tr>
</tbody>
</table>

2.8 EXIT DEVICES

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

1. Exit Devices: Von Duprin (VD) model/series 33A unless otherwise called out in the hardware schedule. Exit devices shall be Rim, with mullion or surface mounted rod type (3327A) where mullions cannot be used.

   *Concealed rod devices shall not be used.*

   a. Where used in conjunction with the security system, devices shall be electrically operated and be provided with accessories/options as needed to complete the access and/or monitoring specified. Power transfer from frame to door to be accomplished with a Von Duprin EPT-2 device or approved equal. The Von Duprin SD-QEL option and battery back-up option shall be used with electrified exit devices.

   b. Where called out in the schedule for double doors, both doors shall be provided with the same device; i.e. both manual or both electrically operated.

2. Cylinders: Schlage (SCH) or Best (BL) rim cylinder with Best 7 pin interchangeable core. Cylinder finish, including spacers and/or rings shall match the rest of the door and/or hardware as called out in the schedule.

3. Strikes: Provide manufacturer’s standard strike with strike box for each latch or lock bolt, finished to match door hardware. Where an electrical strike is indicated, coordinate installation with security system contractor to assure a complete, operable and secure system. Unless specifically called out, electrical strikes will be used in conjunction with non-electrically operated exit devices. Where both an electrical strike and electrical exit device are called out for the same opening, verify with the A/E the sequence and intent of the installation prior to ordering the specified hardware.

2.9 DOOR CLOSERS

A. Provide surface mounted door closures on all exterior exits, public corridor doors, doors specified with security devices, and elsewhere as indicated in the hardware schedule and/or as shown on the drawings.

B. Coordinate the installation of closures with doors specified to receive hold open devices.
C. Provide electrically operated closures at doors identified as ADA accessible and/or specified to receive automatic operators. Coordinate devices with security system where doors are specified to receive security devices in addition to automatic operators. Provide all ancillary equipment and services required to operate electric closers including a dedicated emergency electrical circuit.

D. Unless specifically indicated otherwise, mount closers on non-public side of door, (inside of room, not in hallways). Provide suitable type of arm and handing required and/or recommended by the manufacturer.

E. Closer adjustment shall comply with current building code requirements.

F. Where closures are specified for door pairs, provide coordinators to allow for the proper operation of both doors.

G. Manufacturers: Subject to compliance with requirements, provide the following:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCN Manual Closer</td>
<td>4040XP</td>
</tr>
<tr>
<td>LCN Electric Opener/Closer (Exterior)</td>
<td>9500RF</td>
</tr>
<tr>
<td>LCN Electric Opener/Closer (Interior)</td>
<td>2900</td>
</tr>
</tbody>
</table>

1. Factory finish shall match other door hardware.

2.10 TRIM

A. Manufacturers: The following list represents acceptable products for the miscellaneous trim items. Alternate manufacturer’s products may be used if approved by the A/E via addendum prior to bid in accordance with the products substitution requirements outlined in the Supplemental Conditions.

1. Push/Pull and kickplates:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hager Companies (HAG) Push</td>
<td>30S</td>
</tr>
<tr>
<td>Hager Companies (HAG) Pull</td>
<td>6N</td>
</tr>
<tr>
<td>Hager Companies (HAG) Kick</td>
<td>193S</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS) Push</td>
<td>8200 Series</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS) Pull</td>
<td>8300 Series</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS) Kick</td>
<td>8400 Series</td>
</tr>
<tr>
<td>Trimco (TRI) Push</td>
<td>1001 Series</td>
</tr>
<tr>
<td>Trimco (TRI) Pull</td>
<td>1010 Series</td>
</tr>
<tr>
<td>Trimco (TRI) Kick</td>
<td>K0050 Series</td>
</tr>
</tbody>
</table>

2. Coordinators:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hager Companies (HAG)</td>
<td>298D</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS)</td>
<td>469 Series</td>
</tr>
<tr>
<td>Door Controls International (DCI)</td>
<td>500</td>
</tr>
</tbody>
</table>
3. Removable Mullions:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Von Duprin (@ steel doors)</td>
<td>4954</td>
</tr>
<tr>
<td>Von Duprin (@ aluminum doors)</td>
<td>5654</td>
</tr>
</tbody>
</table>

4. Astragals:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hager Companies (HAG)</td>
<td>872S</td>
</tr>
<tr>
<td>National Guard Products (NGP)</td>
<td>551</td>
</tr>
<tr>
<td>Pemko Manufacturing (PEM)</td>
<td>305N2</td>
</tr>
</tbody>
</table>

5. Thresholds: For means of egress doors, comply with NFPA 101. Bevel raised thresholds with a slope of not more than 1:12. Provide thresholds not more than one-half inch high.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pemko Manufacturing (PEM)</td>
<td>276A</td>
</tr>
<tr>
<td>Sealese</td>
<td>T812</td>
</tr>
<tr>
<td>National Guard Products (NGP)</td>
<td>42S</td>
</tr>
<tr>
<td>Hager Companies (HAG)</td>
<td>430S</td>
</tr>
</tbody>
</table>

6. Wall and Floor Stops: Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead stops.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimco (TRI) post floor stop</td>
<td>1201CK</td>
</tr>
<tr>
<td>Trimco (TRI) dome floor stop</td>
<td>W1210</td>
</tr>
<tr>
<td>Trimco (TRI) wall stop</td>
<td>1270 CV/CX</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS) wall stop</td>
<td>401CCV/CCVX</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS) post floor stop</td>
<td>FS444</td>
</tr>
<tr>
<td>Ives: H. B. Ives (IVS) dome floor stop</td>
<td>FS435/436</td>
</tr>
<tr>
<td>Rockwood wall stop</td>
<td>402</td>
</tr>
<tr>
<td>Rockwood post floor stop</td>
<td>471</td>
</tr>
<tr>
<td>Rockwood dome floor stop</td>
<td>440/441</td>
</tr>
</tbody>
</table>

7. Overhead Stops:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glynn-Johnson (GJ)</td>
<td>100 Series</td>
</tr>
<tr>
<td>Glynn-Johnson (GJ)</td>
<td>450 Series</td>
</tr>
<tr>
<td>Rockwood</td>
<td>14023/14024</td>
</tr>
</tbody>
</table>

8. Electrical Door Holders (magnetic):

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCN</td>
<td>7800 Series</td>
</tr>
<tr>
<td>American Builders Hardware</td>
<td>2100-2700 Series</td>
</tr>
</tbody>
</table>
9. Silencers: neoprene or rubber, fabricated for drilled-in application to frame:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockwood (metal frames)</td>
<td>608</td>
</tr>
<tr>
<td>Rockwood (wood frames)</td>
<td>609</td>
</tr>
<tr>
<td>DCI (metal frames)</td>
<td>8S</td>
</tr>
<tr>
<td>DCI (wood frames)</td>
<td>9S</td>
</tr>
<tr>
<td>Glynn-Johnson (GJ) (metal frames)</td>
<td>64</td>
</tr>
<tr>
<td>Glynn-Johnson (GJ) (wood frames)</td>
<td>65</td>
</tr>
</tbody>
</table>

10. Gasketing: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
   
a. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
   
b. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
   
c. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
   
d. Air leakage shall not exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control.
   
e. Provide smoke-labeled gasketing on all fire-rated doors and/or smoke-labeled doors in accordance with applicable codes.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pemko</td>
<td>S88D</td>
</tr>
<tr>
<td>Hager</td>
<td>726S</td>
</tr>
</tbody>
</table>

11. Weatherstripping:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pemko</td>
<td>3300AV</td>
</tr>
<tr>
<td>Pemko</td>
<td>330OGV</td>
</tr>
<tr>
<td>Pemko</td>
<td>18062CP</td>
</tr>
</tbody>
</table>

12. Bumpers:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ives</td>
<td>WS401 CVX</td>
</tr>
<tr>
<td>Ives</td>
<td>WS402 CVX</td>
</tr>
</tbody>
</table>

13. Latch Protectors:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glynn-Johnson (GJ)</td>
<td>LP Series</td>
</tr>
<tr>
<td>Rockwood</td>
<td>322</td>
</tr>
<tr>
<td>Latchguard</td>
<td>LG 100 Series</td>
</tr>
</tbody>
</table>

2.11 FABRICATION

A. Manufacturer's nameplate: Do not provide manufacturer's products that have manufacturer's name or trade name displayed in a visible location, when the door is in the closed position, except in conjunction with required fire rated labels and as otherwise approved by the Architect.
B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not acceptable unless specifically approved by the A/E on a case by case basis. Provide Phillips flat head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow metal door and frame construction, provide sleeves for each through bolt.

2. Steel Machine or Wood Screws: For the following fire rated applications:
   a. Mortise hinges to doors.
   b. Strike plates to frames.
   c. Closers to doors and frames

3. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2 "Recommended Fasteners for Wood Doors."

2.12 FINISHES

A. Standard: US26D.

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

C. 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 the 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.

2.13 KEYING REQUIREMENTS

A. Owner will combine and install final keyed cores.

B. If during the construction period a key is lost, resulting in the necessity of rekeying/recoring any and/or all of the locks within a building, submaster or master group of locks, the Contractor will be recharged for the cost of such rekeying/recoring.

C. All locks shall be provided with construction keyed cores using one key (ship removal key to Owner) for use during construction. Contractor to coordinate construction keying with Owner to prevent multiple construction sites on the campus from having the same keying. All locksets shall be assembled complete with construction keyed cylinders at the factory.
1. Provide Owner with one construction core removal key, the keyway and key combination for the furnished cores. Provide the Contractor with construction keys as requested by the Contractor.

2. Construction cores shall be removed by the Owner upon installation of the permanent cores. Construction cores will be returned directly to the hardware supplier upon written request including a return material authorization (RMA) with pre-paid shipping. Request will not be honored if not received within 60 days of the project Substantial Completion.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Coordinate installation of security devices with installer of the security system, and verify correct operation prior to covering access to raceways feeding electric strikes, power transfer devices and the like.

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

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 series.

B. Surface applied door hardware: drill and tap doors and frames according to ANSI A250.6.

C. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated in the following applicable publications, unless specifically indicated or required to comply with other codes and/or local jurisdiction requirements:


2. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage and reinstallation of surface trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Power Supplies: Locate power supplies as indicated or, if not indicated above accessible ceilings. If not a factory assembly, provide a j-box of suitable size to contain the power supply(ies) and overload protection. Overload protection shall include a line-side disconnect and/or load side removable fuse, at each individual unit, to allow for maintenance of each power supply without isolation of the entire feeding circuit. Provide at least one power supply per door opening. Size as required to not exceed 100 va, per unit for power units supplying less than 110 volts.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified elsewhere.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation and functionality of every hardware item. Replace items that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.

2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt. Verify correct operation when activated by the security system.

3. Closures: Adjust closures to meet the specifications stated earlier for force and pressure. Readjust after final air balancing, and verify correct adjustment with calibrated force gages. Verify that doors latch and unlatch properly when activated by the security system. Test operations in the presence of the Owner's representative.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.6 OPERATIONS AND MAINTENANCE MANUALS AND TRAINING

A. Provide operations and maintenance manuals as described in Section 01770. Manuals shall include complete manufacturer's installation instructions and parts manuals for all hardware items.

B. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain door hardware and door hardware finishes.

3.7 HARDWARE SCHEDULE

A. The following is a list of minimum hardware items to be provided when called out in the hardware schedule. Coordinate work of other trades to insure a complete and operable installation including but not limited to fire alarm and security components that interface
with the hardware items specified herein. Coordinate quantities and handing of hardware items where pairs or multiple doors occur at the specified opening.

B. Products are identified by using hardware designation numbers of the following manufacturers:

- **Butts and Hinges:** Stanley Hardware, Div. Stanley Works.
- **Locks:** Schlage Lock Co. Div. Ingersoll-Rand Dr Hdw Group.
- **Cylinders:** Best Access Systems
- **Exit/Panic Devices:** Von Duprin, Div. Ingersoll-Rand Door Hardware Group
- **Push/Pull Units:** Rockwood Manufacturing Company
- **Overhead Closers:** LCN Closers, Div Ingersoll-Rand Hardware Group
- **Overhead Stops:** Glynn-Johnson
- **Door Controls:** Ives, Div. Ingersoll-Rand Door Hardware Group
- **Door Stripping and Seals:** Pemko Manufacturing Co., Inc.
- **Continuous Hinges:** Pemko Manufacturing Co., Inc.
- **Auto Door Operators:** LCN, Div. Ingersoll-Rand Door Hardware Group

**HW 01 (Entry Doors)**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Designation</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>EA CONTINUOUS HINGE</td>
<td>CFM83SLFHD1 X CC4-SER</td>
<td>628 PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA MULLION</td>
<td>KR4954</td>
<td>689 VON</td>
</tr>
<tr>
<td>1</td>
<td>EA PANIC HARDWARE</td>
<td>QCEL33A-E0</td>
<td>626 VON</td>
</tr>
<tr>
<td>1</td>
<td>EA PANIC HARDWARE</td>
<td>QCEL33A-NL-OP</td>
<td>626 VON</td>
</tr>
<tr>
<td>2</td>
<td>EA OFFSET DOOR PULL</td>
<td>8190-0</td>
<td>630 IVE</td>
</tr>
<tr>
<td>1</td>
<td>EA SURFACE CLOSER</td>
<td>4040XP EDA</td>
<td>689 LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA AUTO. OPERATOR</td>
<td>9542 REG</td>
<td>628 LCN</td>
</tr>
<tr>
<td>2</td>
<td>EA OVERHEAD STOP</td>
<td>100S</td>
<td>630 GLY</td>
</tr>
<tr>
<td>2</td>
<td>SET SEALS</td>
<td>S88D</td>
<td>DKB PEM</td>
</tr>
<tr>
<td>2</td>
<td>EA DOOR SWEEP</td>
<td>315CN</td>
<td>AL PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>171AK</td>
<td>AL PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA POWER SUPPLY</td>
<td>PS914-2Q</td>
<td>GRY VON</td>
</tr>
<tr>
<td>2</td>
<td>EA ACTUATOR, WALL</td>
<td>8310-3856WF</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>EA RECEIVER</td>
<td>8310-865</td>
<td>LCN</td>
</tr>
</tbody>
</table>

**HW 02 (Stair Exits)**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Designation</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>EA CONTINUOUS HINGE</td>
<td>CFM83SLFHD1</td>
<td>628 PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA MULLION</td>
<td>KR4954</td>
<td>689 VON</td>
</tr>
<tr>
<td>1</td>
<td>EA PANIC HARDWARE</td>
<td>33A-E0</td>
<td>626 VON</td>
</tr>
<tr>
<td>1</td>
<td>EA PANIC HARDWARE</td>
<td>33A-NL-OP</td>
<td>626 VON</td>
</tr>
<tr>
<td>1</td>
<td>EA RIM CYLINDER</td>
<td>1E72</td>
<td>626 BES</td>
</tr>
<tr>
<td>1</td>
<td>EA MORTISE CYLINDER</td>
<td>1E74</td>
<td>626 BES</td>
</tr>
<tr>
<td>2</td>
<td>EA OFFSET DOOR PULL</td>
<td>8190-0</td>
<td>630 IVE</td>
</tr>
<tr>
<td>2</td>
<td>EA SURFACE CLOSER</td>
<td>4040XP EDA</td>
<td>689 LCN</td>
</tr>
<tr>
<td>2</td>
<td>EA OVERHEAD STOP</td>
<td>100S</td>
<td>630 GLY</td>
</tr>
<tr>
<td>2</td>
<td>SET SEALS</td>
<td>S88D</td>
<td>DKB PEM</td>
</tr>
<tr>
<td>2</td>
<td>EA DOOR SWEEP</td>
<td>315CN</td>
<td>AL PEM</td>
</tr>
<tr>
<td>1</td>
<td>EA THRESHOLD</td>
<td>171AK</td>
<td>AL PEM</td>
</tr>
<tr>
<td>Location</td>
<td>Item</td>
<td>Model/Part No.</td>
<td>Vendor</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
<td>-----------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>HW 03 (Front Desk)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 EA</td>
<td>HINGE</td>
<td>BB5000-450</td>
<td></td>
</tr>
<tr>
<td>2 EA</td>
<td>MANUAL FLUSH BOLT</td>
<td>FB4558</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>DUST PROOF STRIKE</td>
<td>DP2</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>CLASSROOM LOCK</td>
<td>ND70BD RHO</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER CORE</td>
<td>1E70</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>404XP REG</td>
<td></td>
</tr>
<tr>
<td>2 EA</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>2 EA</td>
<td>SILENCER</td>
<td>SR84</td>
<td></td>
</tr>
<tr>
<td><strong>HW 04 (Offices with Card Reader)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>BB5000-450N</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER TRANSFER</td>
<td>EPT-2</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER CORE</td>
<td>1E70</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRONIC LOCK</td>
<td>AD-300-CY-70-PR-RHO-BD</td>
<td>626 SCE</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>404XP EDA</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>3 EA</td>
<td>SILENCER</td>
<td>SR84</td>
<td></td>
</tr>
<tr>
<td><strong>HW 05 (Stairs)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>BB5000-450N</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER TRANSFER</td>
<td>EPT-2</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>FIRE EXIT HARDWARE</td>
<td>99EO-F</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>EXIT DUMMY TRIM</td>
<td>AD-993DT-RHO-PD</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>404XP REG</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>1 SET</td>
<td>SEALS</td>
<td>S88D</td>
<td></td>
</tr>
<tr>
<td><strong>HW 06 (Mechanical with Card Reader)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA</td>
<td>HINGE</td>
<td>BB5000-450N</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>POWER TRANSFER</td>
<td>EPT-2</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>CYLINDER CORE</td>
<td>1E70</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>ELECTRONIC LOCK</td>
<td>AD-300-CY-70-PR-RHO-BD</td>
<td>626 SCE</td>
</tr>
<tr>
<td>1 EA</td>
<td>SURFACE CLOSER</td>
<td>404XP EDA</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td></td>
</tr>
<tr>
<td>1 EA</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>3 EA</td>
<td>SILENCER</td>
<td>SR84</td>
<td></td>
</tr>
</tbody>
</table>
### HW 07 (Dorm Rooms)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>BB5000-450</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CORRIDOR LOCK</td>
<td>ND73BD RHO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER CORE</td>
<td>1E70</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP REG</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>S88D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>652 BOM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 SCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 BES</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>689 LCN</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>630 IVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 IVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DKB PEM</td>
<td></td>
</tr>
</tbody>
</table>

### HW 08 (Offices)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>BB5000-450</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ENTRANCE LOCK</td>
<td>ND53BD RHO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER CORE</td>
<td>1E70</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SILENCER</td>
<td>SR64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>652 BOM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 SCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 BES</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 IVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRY IVE</td>
<td></td>
</tr>
</tbody>
</table>

### HW 09 (Storage)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>BB5000-450</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>STOREROOM LOCK</td>
<td>ND80BD RHO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CYLINDER CORE</td>
<td>1E70</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SILENCER</td>
<td>SR64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>652 BOM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 SCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 BES</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 IVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GRY IVE</td>
<td></td>
</tr>
</tbody>
</table>

### HW 10 (Bathrooms)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item Description</th>
<th>Code</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HINGE</td>
<td>BB5000-450</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>PASSAGE SET</td>
<td>ND105 RHO</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURFACE CLOSER</td>
<td>4040XP EDA</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>KICK PLATE</td>
<td>8400 10&quot; X 2&quot; LDW</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>WALL STOP</td>
<td>WS402CCV</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SET SEALS</td>
<td>S88D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>652 BOM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 SCH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>689 LCN</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>630 IVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>626 IVE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DKB PEM</td>
<td></td>
</tr>
</tbody>
</table>

**END OF SECTION 08 71 00**
SECTION 08 80 00

GLAZING

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Doors.
   2. Storefront framing.
   3. Glazed entrances.
   4. Interior borrowed lites.

B. Related Sections:
   1. Division 08 Section "Aluminum Entrances and Storefronts."

1.3 DEFINITIONS
A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS
A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
   1. Design Wind Pressures: As indicated on Drawings.
   2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
a. Basic Wind Speed: 85 mph (38 m/s).
b. Importance Factor: 1.15.
c. Exposure Category: C.

3. Design Snow Loads: As specified in structural general notes and in drawings.
4. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
5. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
6. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.6 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of the following products; 12 inches (300 mm) square.

1. Insulating glass.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and manufacturers of insulating-glass units with sputter-coated, low-e coatings.
B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass.

D. Warranties: Sample of special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Source Limitations for Glass: Obtain laminated glass and insulating glass from single source from single manufacturer for each glass type.

D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

E. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.


F. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.
1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

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

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

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

C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

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

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick unless otherwise noted.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL’s WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Float Glass (Symbol F): ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass (Symbol T): ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.

C. Laminated Glass (Symbol L): ASTM C 1172, and complying with testing requirements in 18 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

D. Insulating-Glass Units (Symbol IG): Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

E. Basis of Specification: PPG, SolarBan 60 Solar Control Low-E. Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article.
1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Lite: \( \frac{3}{4} \) inch.
3. Interspace Content: Air.
4. Indoor Lite: Clear Float Glass.
5. Outdoor Lite: Clear Float Glass.

a. Coating on second surface.

6. Provide Kind FT (fully tempered) on inside and outside light where safety glass is required.

**F. Performance:** Comply with the following requirements:

1. Visible Light Transmittance (Tv): No less than 69%.
2. Winter U-Value: No greater than 0.29.
3. Solar Heat Gain Coefficient (SHGC): No greater than 0.37.
4. Shading Coefficient: 0.44.
5. Light to Solar Gain (LSG): 1.86

### 2.3 GLAZING SEALANTS

**A. General:**

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Colors of Exposed Glazing Sealant: As selected by Architect from manufacturer's full range.

**B. Elastomeric Glazing Sealant Standard:** Provide manufacturer's standard chemically curing elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements including those referencing ASTM classifications for Type, Grade, Class and Uses.

**C. Secondary Seal (Weatherseal):** Silicone sealant secondary seals shall be compatible with structural silicone sealant (if any) used. The weatherseal shall accommodate a 50 percent increase or decrease of joint width as measured at time of application according to ASTM C 719. Provide backer rod as recommended by the manufacturer.

### 2.4 GLAZING TAPES

**A. Back-Bedding Mastic Glazing Tapes:** Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
   2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

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

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.7 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 GLASS SCHEDULE

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>TYPE</th>
<th>LOCATION (Where indicated and: )</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Float Glass</td>
<td>Typical interior except where otherwise noted</td>
</tr>
<tr>
<td>T/L</td>
<td>Safety Glass</td>
<td>Doors &amp; where required by IBC</td>
</tr>
<tr>
<td></td>
<td>¼” Clear</td>
<td>2406, L at shelving, display case doors and fixed panels.</td>
</tr>
<tr>
<td></td>
<td>Safety Glass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/16” Clear</td>
<td></td>
</tr>
<tr>
<td>IG</td>
<td>1” insulating, Clear, low E coated</td>
<td>Exterior, typical except where otherwise indicated. Tempered, Low E coated where required by IBC 2406 5/8” thick in doors.</td>
</tr>
</tbody>
</table>

END OF SECTION 08 80 00
<table>
<thead>
<tr>
<th>Room No. &amp; Name</th>
<th>Floor Finish</th>
<th>Base</th>
<th>North</th>
<th>East</th>
<th>South</th>
<th>West</th>
<th>Ceiling</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOBBY</td>
<td>PCF-1</td>
<td>RB</td>
<td>P</td>
<td>N/A</td>
<td>N/A</td>
<td>P</td>
<td>APC-1</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WPC-1</td>
<td></td>
</tr>
<tr>
<td>PORCH</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>WPC-1</td>
<td></td>
</tr>
<tr>
<td>FRONT DESK</td>
<td>PCF-1</td>
<td>RB</td>
<td>N/A</td>
<td>N/A</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>MAIL</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
<td></td>
</tr>
<tr>
<td>RESIDENT LIFE</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
<td></td>
</tr>
<tr>
<td>VESTIBULE</td>
<td>CONC-1</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MECH/ELEC/STORAGE</td>
<td>CONC-1</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>RD OFFICE</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
<td></td>
</tr>
<tr>
<td>RD APARTMENT</td>
<td>CPS</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RD BATH</td>
<td>CT</td>
<td>CT</td>
<td>P</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>RECEIVING</td>
<td>CONC-1</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>RHA/STAFF</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
<td></td>
</tr>
<tr>
<td>Room No. &amp; Name</td>
<td>Floor Finish</td>
<td>Base</td>
<td>North</td>
<td>East</td>
<td>South</td>
<td>West</td>
<td>Ceiling</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------</td>
<td>------</td>
<td>-------</td>
<td>------</td>
<td>-------</td>
<td>------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>TOILET</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>P</td>
</tr>
<tr>
<td>CORRIDOR</td>
<td>CONC-1</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
</tr>
<tr>
<td>SERVERY</td>
<td>RSF</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
</tr>
<tr>
<td>UNFINISHED SPACE</td>
<td>CONC-1</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CUSTODIAN OFFICE</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
</tr>
<tr>
<td>CORRIDOR</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
<td></td>
</tr>
<tr>
<td>DOUBLE/TRIPLE</td>
<td>RSF</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>TELE/MECH/ELEC</td>
<td></td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAUNDRY</td>
<td>RSF</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>APC</td>
<td></td>
</tr>
<tr>
<td>LOUNGE/KITCHEN</td>
<td>CPT</td>
<td>RB</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>BATHROOM</td>
<td>CT-1</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>CUST/RECYCLE</td>
<td>CT-1</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>CT</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td></td>
</tr>
</tbody>
</table>

FINISH SCHEDULE
9/30/2011
<table>
<thead>
<tr>
<th>Spec. Section</th>
<th>Item</th>
<th>Keyword</th>
<th>Manufacturer</th>
<th>Color</th>
<th>Finish/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03 30 00</td>
<td>Sealed Concrete</td>
<td>CONC-1</td>
<td></td>
<td>(Gray)</td>
<td>Clear Finish</td>
</tr>
<tr>
<td>03 35 36</td>
<td>Polished Concrete Floor Finish</td>
<td>PCF-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04 21 13</td>
<td>Brick Masonry</td>
<td>BRICK-1</td>
<td>Autumn Blend</td>
<td>Size: Standard</td>
<td></td>
</tr>
<tr>
<td>04 72 00</td>
<td>Cast Stone Masonry</td>
<td>CSM</td>
<td></td>
<td></td>
<td>Color/Finish to match Senior Hall</td>
</tr>
<tr>
<td>06 40 23</td>
<td>Architectural Woodwork</td>
<td>Wood Veneer</td>
<td></td>
<td>White Maple</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solid Surfacing</td>
<td>SS-1</td>
<td>Corian</td>
<td>Witch Hazel</td>
<td>Restroom Countertops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SS-2</td>
<td></td>
<td></td>
<td>Kitchen Countertops</td>
</tr>
<tr>
<td></td>
<td>Plastic Laminate</td>
<td>PLAM-1</td>
<td>Regimental Red</td>
<td></td>
<td>Reception Upper Casework</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLAM-2</td>
<td>Formica</td>
<td>Pear</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fiberglass Reinforced Plastic Panels</td>
<td>FRP-1</td>
<td>Marlite</td>
<td>TBD from manufacturer's standards</td>
<td></td>
</tr>
<tr>
<td>07 31 13</td>
<td>Asphalt Shingles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 42 13.13</td>
<td>Formed Metal Wall and Soffit Panels</td>
<td></td>
<td>AEP Spun-&quot;Prestige&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 54 23</td>
<td>TPO Roofing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 62 00</td>
<td>Sheet Metal Flashing and Trim</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 11 13</td>
<td>Hollow Metal Doors and Frames</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 14 16</td>
<td>Flush Wood Doors</td>
<td></td>
<td>White Maple</td>
<td>Plain Sliced, Clear Finish, Satin Sheen</td>
<td></td>
</tr>
<tr>
<td>08 32 13</td>
<td>Sliding Aluminum-Framed Glass Doors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 33 23</td>
<td>Overhead Ceiling Doors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 33 36</td>
<td>Side Ceiling Grille</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 41 13</td>
<td>Aluminum Entry and Storefront</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 44 13</td>
<td>Glazed Aluminum Curtainwall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 51 13</td>
<td>Aluminum Windows</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**09 00 01 FINISHES LEGEND (Updated 09/30/2011)**
<table>
<thead>
<tr>
<th>Spec. Section</th>
<th>Item</th>
<th>Keyword</th>
<th>Manufacturer</th>
<th>Color</th>
<th>Finish/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>08 53 13</td>
<td>Vinyl Windows</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08 80 00</td>
<td>Glazing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09 30 00</td>
<td>Tiling</td>
<td>CT-1</td>
<td>Florida Tile</td>
<td>07 Natural</td>
<td>6&quot; x 6&quot; Ceramic Tile</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT-2</td>
<td>American Clean</td>
<td>Sable SE64 (2)</td>
<td>St. Germain, 12&quot; x 12&quot; Porcelain Tile</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT-3</td>
<td>Deltile</td>
<td>Rainforest P666</td>
<td>1&quot; x 1&quot; Glass Mosaic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT-4</td>
<td>Deltile</td>
<td>Desert Mirage P667</td>
<td>1&quot; x 1&quot; Glass Mosaic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT-5</td>
<td>Deltile</td>
<td>Lake Shores P665</td>
<td>1&quot; x 1&quot; Glass Mosaic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT-6</td>
<td>Deltile</td>
<td>Caribbean Surf GR22</td>
<td>1&quot; x 1&quot; Glass Mosaic</td>
</tr>
<tr>
<td></td>
<td>Tile Grout</td>
<td>GROUT-1</td>
<td>Custom Building Products</td>
<td>#185 New Taupe</td>
<td>Floor Grout – Dark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GROUT-2</td>
<td>Laticrete</td>
<td>16 Sauterne</td>
<td>Wall Grout – Light</td>
</tr>
<tr>
<td>09 51 13</td>
<td>Acoustical Panel Ceilings</td>
<td>APC-1</td>
<td></td>
<td></td>
<td>24&quot; x 24&quot; Square Lay-in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>APC-2</td>
<td></td>
<td></td>
<td>24&quot;x48&quot; Square Lay-in; Unperforated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WPC-1</td>
<td></td>
<td></td>
<td>Wood Slat Ceiling Panels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WPC-2</td>
<td></td>
<td></td>
<td>Wood Slat Ceiling Panels for interior and exterior locations</td>
</tr>
<tr>
<td>09 65 13</td>
<td>Rubber Base and Accessories</td>
<td>RB-1</td>
<td></td>
<td></td>
<td>4&quot; Rubber Base</td>
</tr>
<tr>
<td></td>
<td>Transition Strip/Reducer</td>
<td>TS-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TS-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09 65 19</td>
<td>Resilient Tile Flooring</td>
<td>RTF</td>
<td>LG Hausys Deco &quot;Advantage Wood&quot;</td>
<td>Luxury Vinyl Tile - ALTERNATE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VCT</td>
<td>Armstrong</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resilient Sheet Flooring</td>
<td>RSF-1</td>
<td>Armstrong 00731-Luscious</td>
<td>Abode – Base Bid Doubles/Triples</td>
<td></td>
</tr>
<tr>
<td>09 68 13</td>
<td>Carpet Tiling</td>
<td>CPT-1</td>
<td>Patcraft</td>
<td>00731-Luscious</td>
<td>Earthen Weave Modular 10286</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CPT-2</td>
<td>Patcraft</td>
<td>00731-Luscious</td>
<td>City flora Modular 10285</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CPT-3</td>
<td>Patcraft</td>
<td>00731-Luscious</td>
<td>Cool Rain Modular 10283</td>
</tr>
<tr>
<td>09 72 00</td>
<td>Vinyl Wallcovering</td>
<td>VWC-1</td>
<td>Trikes</td>
<td>Source One – Prestige</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VWC-2</td>
<td>Trikes</td>
<td>Lanark - Boardwalk</td>
<td></td>
</tr>
<tr>
<td>Spec. Section</td>
<td>Item</td>
<td>Keyword</td>
<td>Manufacturer</td>
<td>Color</td>
<td>Finish/Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>---------</td>
<td>----------------------</td>
<td>------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>09 91 00</td>
<td>Paint</td>
<td>P-1</td>
<td>Sherwin Williams</td>
<td>SW7567 Natural Tan</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-2</td>
<td>Sherwin Williams</td>
<td>SW7569 Stucco</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-3</td>
<td>Sherwin Williams</td>
<td>SW6122 Camelback</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-4</td>
<td>Sherwin Williams</td>
<td>SW7608 Adrift</td>
<td>Blue Accent – Light</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-5</td>
<td>Sherwin Williams</td>
<td>SW7609 Georgian Revival Blue</td>
<td>Blue Accent – Dark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-6</td>
<td>Sherwin Williams</td>
<td>SW7503 Sticks and Stones</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-7</td>
<td>Sherwin Williams</td>
<td>Versatile Gray</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-8</td>
<td>Sherwin Williams</td>
<td>SW6401 Independent Gold</td>
<td>Green Accent – Light</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-9</td>
<td>Benjamin Moore</td>
<td>2146-30 Split Pea</td>
<td>Green Accent – Dark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-10</td>
<td>Sherwin Williams</td>
<td>SW6108 Latte</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-11</td>
<td>Sherwin Williams</td>
<td>SW7702 Spiced Cider</td>
<td>Copper Accent – Light</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-12</td>
<td>Sherwin Williams</td>
<td>SW6356 Copper Mountain</td>
<td>Copper Accent – Dark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-13</td>
<td>Sherwin Williams</td>
<td>SW7045 Intellectual Gray</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-14</td>
<td>Sherwin Williams</td>
<td>SW6129 Restrained Gold</td>
<td>Gold Accent – Light</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-15</td>
<td>Sherwin Williams</td>
<td>SW6389 Butternut</td>
<td>Gold Accent – Dark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-16</td>
<td>Sherwin Williams</td>
<td>SW7743 Mountain Road</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-17</td>
<td>Parker Paint</td>
<td>CLV110N Beget</td>
<td>Red Accent</td>
</tr>
<tr>
<td>10 11 00</td>
<td>Visual Display Boards</td>
<td>MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Markerboards</td>
<td>Tackboard</td>
<td>TB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 14 00</td>
<td>Signage</td>
<td></td>
<td></td>
<td></td>
<td>By Owner</td>
</tr>
<tr>
<td>10 21 13</td>
<td>Toilet Compartment</td>
<td></td>
<td></td>
<td>HDPE</td>
<td></td>
</tr>
<tr>
<td>10 21 16</td>
<td>Shower and Dressing Compartments</td>
<td></td>
<td></td>
<td>HDPE</td>
<td></td>
</tr>
<tr>
<td>10 26 00</td>
<td>Wall and Door Protection</td>
<td></td>
<td></td>
<td>Corner Guards (Stainless Steel)</td>
<td></td>
</tr>
<tr>
<td>10 50 00</td>
<td>Miscellaneous Specialties</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skateboard Deterrent Devices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metal Wardrobe Lockers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 21 13</td>
<td>Horizontal Louver Blinds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 24 13</td>
<td>Roller Shades</td>
<td></td>
<td></td>
<td>Opaque Fabric Manually Operated</td>
<td></td>
</tr>
<tr>
<td>12 48 13</td>
<td>Floor Mats and Frames</td>
<td>EM-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 21 00</td>
<td>Electric Traction Elevator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

END OF FINISHES LEGEND
SECTION 09 21 16.23

GYPSUM BOARD SHAFT WALL ASSEMBLIES

1.1 GYPSUM BOARD SHAFT WALL ASSEMBLIES

A. Comply with low-emitting material credit requirements for LEED - NC.

B. Fire-Resistance Rating: 2 hours.

C. Stud Depth: As indicated.

D. Runner Tracks: Manufacturer's standard J-profile track.

E. Firestop Tracks: To allow movement while maintaining continuity of fire-resistance rating.

F. Insulation: Sound attenuation blanket.

1.2 MATERIALS

A. Gypsum Shaft Liner: Moisture- and mold-resistant Type X

1. Recycled Content: Postconsumer recycled content plus one-half of postconsumer recycled content not less than <Insert number> percent by weight.

2. Comply with regional material credit requirements for LEED-NC.

B. Non-Load-Bearing Steel Framing: ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized unless otherwise indicated.

C. Auxiliary Materials:

1. Trim accessories.

2. Steel drill screws.

3. Track fasteners.

END OF SECTION 09 21 16.23
SECTION 09 21 26.43
ACOUSTICAL WALL CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Acoustical batt insulation.
   2. Acoustical sealant.
   3. Resilient sound isolation clips, including related light-gauge metal framing.
   4. Wall penetration isolation.
   5. Electrical conduit isolation.
   6. Acoustical requirements for installation of electrical boxes.
   7. Acoustical requirements for installation gypsum board and support framing.
   8. LEED documentation.

B. Related Sections:
   1. 013542 - LEED Certification Requirements.
   2. 072100 - Thermal Insulation: Thermal batt and blanket insulation.
   3. 078400 - Firestopping: Fire rated penetration seals.
   4. 092900 - Gypsum Board: Related construction.
   5. 095123 - Acoustical Ceiling Tiles.

C. Substitutions shall be in accordance with Section 016000.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1.3 SUBMITTALS

A. Make submittals in accordance with Section 013300.

B. Product Data: Submit for proposed materials and components.

C. LEED Submittals:
   1. Make LEED submittals in accordance with Section 013542.
   2. MR 4.1and 4.2 Recycled Content Credit:
      a. Submit a signed LEED Letter Template stating % of Post-Consumer and % of Pre-Consumer Recycled Content.
      b. Provide cost data as necessary to verify the credit.
   3. EQ 4.1 Low Emitting Materials - Adhesives and Sealants: Submit product data for each interior adhesive verifying VOC levels.
1.4 PROJECT ACOUSTICAL CONSULTANTS

A. The Acoustical Consultant for this project is:

1. Andrew Boone
2. Sparling
3. 720 Olive Way, Suite 1400
4. Seattle, WA 98101
5. Phone: (206) 667-0555
6. Fax: (206) 667-0554
7. Email: aboone@sparling.com

1.5 QUALITY ASSURANCE

A. Discrepancies between the Drawings and the specifications shall be brought to the immediate attention of the Architect.

B. Pre-Installation Conference:
   1. Administer a Pre-installation conference in accordance with Section 013100.
   2. Require the following in attendance:
      a. Architect.
      b. Acoustical Consultant.
      c. Contractor.
      d. Trades involved in the installation of specified and indicated acoustical assemblies
   3. Agenda: Discuss product requirements and installation details for the following:
      a. Acoustical batt insulation.
      b. Acoustical sealant.
      c. Resilient sound isolation clips and hat channel furring.
      d. Wall penetration isolation.
      e. Electrical conduit isolation.
      f. Acoustical requirements for installation of electrical boxes.
      g. Acoustical requirements for installation gypsum board and support framing.

C. Mock-ups:
   1. Provide mock-ups in accordance with Section 014000.
   2. Exterior Envelope Mock-up:
      a. Provide acoustical assembly as a part of the exterior envelope mock-up indicated on the Drawings.
      b. Remove mock-up when directed by the Architect.
   3. Representative Assemblies Mock-up:
      a. Provide installation of acoustical plumbing, electrical, HVAC, gypsum board, and support framing assemblies used in the first floor of the Hotel.
      b. Systems shall be representative of the typical assemblies which will be used in the Project.
      c. Installations shall represent approximately a 25% portion of the Project.
      d. Approved mock-ups may be used in the finished work.

PART 2 - PRODUCTS

2.1 STANDARD CAULK

A. Standard caulk shall be a paintable caulk.
2.2 ACOUSTICAL SEALANT

A. Acoustical Sealant shall meet the following requirements:
   1. Sealant shall be a non-hardening, non-bleeding, non-drying, resilient caulk.

B. Acceptable Products - The following list of products are acoustically acceptable in all applications where acoustical sealant is called for. They have been broken out into different categories (concealed, fire rated, paintable, etc) for ease of coordination with other disciplines.
   1. Concealed Fire Rated Acoustical Sealants
      a. CP 604 Self-leveling Firestop Sealant by Hilti
      b. Fire Barrier Water Tight Sealant 1003 SL (self-leveling) by 3M Vibration Control
      c. Nelson Firestop Sealant (CLK)
   2. Paintable Fire Rated Acoustical Sealants
      b. CP 672 Firestop Joint Spray by Hilti
      c. CP 606 Flexible Firestop Sealant by Hilti
   3. Concealed Acoustical Sealant
      a. 790 Silicone Building Sealant by Dow Corning
   4. Paintable Acoustical Sealant
      a. Acoustical Sealant by U.S. Gypsum Company
      b. Acoustical Sealant by Tremco
      c. CP 572 Smoke and Acoustics Spray by Hilti
      d. CP 506 Smoke and Acoustics Sealant by Hilti

C. Substitutions:
   1. Substitutions shall comply with specified requirements.
   2. Contractor shall submit to the Acoustical Engineer for review and approval of all substitutions for Acoustical Sealant the following:
      a. Manufacturer’s product information
      b. Manufacturer’s product specifications
      c. Product sample consisting of a bead of caulk, approximately 3” long, 1/4” high, and 1/2” wide, applied to a portable substrate (i.e. cardboard or paper) and cured according to manufacturer’s instructions.

2.3 INSULATION BATTs

A. Unfaced Batt Insulation: ASTM C665, Type I; preformed unfaced glass fiber roll; flame spread of 25 or less and smoke developed of 50 or less when tested in accordance with ASTM E84; oversize widths for friction-fit between framing; density to provide the R values in the spaces indicated; GreenGuard Indoor Air Quality Certified.

2.4 METAL FURRING

A. Hat Channels: ASTM C645; minimum 25 gauge sheet metal; 7/8 inch depth; G60 galvanized coating.

2.5 RESILIENT SOUND ISOLATION CLIPS

A. Acceptable Products:
   1. RSIC-1 by Pac International
   2. Isomax by Kinetics
   3. GenieClip by Pliteq
2.6 ACCESSORIES
   1. Accessories: Furnish other accessories such as fasteners and retainers, not specifically described, but required for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.
   B. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
   C. Do not begin work until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

3.2 PREPARATION
   A. Verify that adjacent materials are secure, properly spaced, dry, and ready to receive installation.
   B. Verify that mechanical and electrical services within spaces to be insulated have been installed and tested.
   C. Furnish acoustical insulation to hollow metal installer for installation in hollow metal frames in acoustical partitions.

3.3 INSTALLATION
   A. Install insulation in stud cavities in accordance with manufacturer's instructions, and as indicated. Coordinate with other trades as necessary to complete acoustical barriers at wall penetrations.
   B. Install insulation without gaps or voids.
   C. Trim insulation neatly to fit spaces. Use insulation materials free of damage.
   D. Except for penetrations in fire rated construction to receive firestopping or fire rated construction joint assemblies, seal all penetrations through acoustical assemblies, including cutouts for lighting fixtures, cabinets, pipes and plumbing, HVAC ducts, and electrical boxes.

3.4 ACOUSTICAL WALL CONSTRUCTION
   A. Gypsum Wallboard
      1. Tape and mud all joints between adjacent sheet edges at outermost layer of wallboard.
      2. Where two layers (or more) of wallboard are used, stagger all joints between the first layer and the second layer.
   B. Framing for double stud walls
1. The air space between the two wall frames (studs) shall be as indicated on the plans.
2. Maintain continuous separation between the two wall frames.
3. Make sure that framing members, blocking, and spacers do not connect the two wall frames.
4. Where irregularities occur, ensure separation between wall frames shall be no less than 1/2".
5. Bring to the architect's attention, prior to wall closure, any conflicts with other trades that result in unavoidable connection between the two wall frames of the double wall.

3.5 PENETRATION ISOLATION

A. Scope:
   1. Penetration requirements identified in this section will be applied to all of the following:
      a. All double stud walls
      b. Level 5 Ceiling Penetrations

B. Method:
   1. Isolate all ductwork, conduit and pipework (including sprinkler system) greater than 2" in diameter at penetrations as follows:
      a. Provide a sheet metal (22 gauge) sleeve to cover the entire perimeter of a 1 inch to 1-1/2 inch (1/2 inch to 3/4 inch on each side) oversized penetration cut. Penetration openings that are framed on all sides of the partition do not require the structural sleeve. Oversize framing penetration as called for openings with sleeves.
      b. Plaster or caulking sleeve to the wall, ceiling, or floor, to ensure an airtight seal.
      c. If ductwork or pipework penetrates a double wall, use a separate sleeve at each side of the wall (allow no sleeve connection between walls).
      d. Pack the gap between the penetrating duct or pipe and the sleeve with Acoustical Insulation and seal airtight on both sides of the wall, floor, or ceiling with an outer layer of Acoustical Sealant.
      e. Do not use wall, floor, or ceiling penetrations to support pipework or ductwork. Support pipe or duct just prior to and just after the penetration, so that the pipe or duct is centered in penetration.
      f. Use the above penetration treatment regardless of the existence of external duct or pipe insulation. Size penetration large enough to pack additional Acoustical Insulation and apply Acoustical Sealant between the external insulation and the sheet metal sleeve.
   2. Isolate all conduit and pipework (including sprinkler system) less than or equal to 2" in diameter at penetrations as follows:
      a. Oversize penetration by 3/8 inch on each side.
      b. Seal gap airtight with Acoustical Sealant.
      c. Do not use wall, floor, or ceiling penetrations to support pipework or ductwork. Support pipe or duct just prior to and just after the penetration, so that the pipe or duct is centered in penetration.
      d. Use the above penetration treatment regardless of the existence of external duct or pipe insulation. Size penetration large enough to apply Acoustical Sealant between the external insulation and the penetration.

3.6 ELECTRICAL CONDUIT ISOLATION

A. Use flexible electrical conduit to isolate all electrical connections between acoustical walls and other walls or structure.

B. Do not use conduit clamps or hangers between the flex conduit and acoustical walls.
C. Flex conduit shall be minimum 3 feet long.

3.7 ELECTRICAL BOXES

A. Do not place electrical boxes back-to-back within one stud cavity.

B. Offset back-to-back boxes a minimum distance of 18" for single stud walls and a minimum offset of 36" for double stud walls (with at least one stud between the boxes).

C. Fill the cavity around the box with fiberglass insulation.

D. Mud rings must have backboxes.

E. Seal between boxes and wallboard with Acoustical Sealant.

F. Seal all openings in boxes and backboxes with Acoustical Sealant.

G. For double stud walls, run wiring on the side of the wall that it serves, only. Locate junction boxes to combine wiring outside of double wall.

H. Bring to the architect's attention, prior to wall closure, any conflicts with other trades that result in unavoidable connection between the two wall frames of a double wall.

3.8 ACOUSTICAL SEALANT INSTALLATION

A. Caulk bead shall fill gap and shall be not less than 3/8" deep.

END OF SECTION 09 21 26.43
SECTION 09 22 16
NON-LOAD BEARING STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to Division 1 Section “Sustainable Design Requirements – NC” for submittal requirements and formats.

1.2 SUMMARY

A. Section Includes:

1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

B. Related Requirements:

1. Division 06 "Rough Carpentry" for wood framed walls and partitions.
2. Division 09 Section "Gypsum Board".

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 DESCRIPTION

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.


B. Studs and Runners: ASTM C 645.

1. Steel Studs and Runners:
   a. Minimum Base-Metal Thickness: 0.027 inch (0.68 mm).
   b. Depth: As indicated on Drawings or as required by conditions of installation.

C. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
2. Depth: 7/8 inch (22.2 mm).

D. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

E. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 3/4 inch (19 mm).
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

F. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
   a. Type: Postinstalled, chemical anchor or Postinstalled, expansion anchor.

2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: As indicated on Drawings or required by condition of installation.

E. Furring Channels (Furring Members):
   1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
   2. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
      a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
   3. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
      a. Configuration: Asymmetrical or hat shaped.

F. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      b. Chicago Metallic Corporation; Drywall Grid System.
      c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
   1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:
   1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches (406 mm) o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
a. Install two studs at each jamb unless otherwise indicated.
b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:
1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:
1. Erect insulation, specified in Section 07210 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Do not attach hangers to steel roof deck.

5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16
SECTION 09 29 00
GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to Division 1 Section “Sustainable Design Requirements – NC” for submittal requirements and formats.

1.2 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Glassfiber reinforced gypsum (GRG).

B. Related Requirements:
   1. Division 08 Section “Sheathing” for gypsum sheathing for exterior walls.
   2. Division 09 Section “Non-Structural Metal Framing” for non-structural framing and suspension systems that support gypsum board panels.
   3. Division 09 Section “Tiling” for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
   2. Textured Finishes: Manufacturer’s standard size for each textured finish indicated and on same backing indicated for Work.

1.4 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.
1.5 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.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. American Gypsum.
   2. CertainTeed Corp.
   3. Georgia-Pacific Gypsum LLC.
   5. PABCO Gypsum.
   6. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
   1. Thickness: 1/2 inch (12.7 mm).
   2. Long Edges: Tapered.

E. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
   1. Core: 5/8 inch (15.9 mm), Type X.
   2. Long Edges: Tapered.

F. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
   1. Thickness: ¼ inch (6.4 mm).
   2. Long Edges: Tapered.

   1. Core: 5/8 inch (15.9 mm), Type X.
   2. Long Edges: Tapered.

2.4 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corp.; GlasRoc Tile Backer.
      b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
   2. Core: 5/8 inch (15.9 mm), Type X.

2.5 GLASSFIBER REINFORCED GYPSUM BOARD (GRG)

A. 
B. 
C. 

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. L-Bead: L-shaped; exposed long flange receives joint compound.
   d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
3. ½" Reveals and Molding:
   a. Fry Reglet ½" Reveal Molding DRM 50-50.
   b. Fry Reglet "Snap-In" Reveal (1/2") DRM-SNAP-IN-50.
   c. Fry Reglet "Z" Reveal (1/2") DRMZ50-50.
   d. Fry Reglet "J" Molding (1/2") JD5-50.
   e. Fry Reglet "F" Reveal Molding (1/2") DRMFR50-50.
   f. Fry Reglet Drywall/Acoustical Reveal (1/2") DRMAD-50-50.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
   1. Interior Gypsum Board: Paper.
   2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board:
   For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints 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 drying-type, all-purpose compound.
   4. Finish Coat: For third coat, use drying-type, all-purpose compound.
   5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Tile Backing Panels:
   1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
   2. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

   1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermostetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
   2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent.

E. 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, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Accumeatric LLC; BOSS 824 Acoustical Sound Sealant.
      b. Grabber Construction Products; Acoustical Sealant GSC.
      c. Pecora Corporation; AC-20 FTR.
      e. 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).

F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

G. Vapor Retarder: As specified in Division 07 Section "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 (1.5 mm) 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. (0.7 sq. m) 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- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
1. Regular Wallboard Type: Vertical surfaces unless otherwise indicated.
2. Type X: Where required for fire-resistance-rated assembly.
3. Ceiling Type: Ceiling surfaces.
4. Moisture- and Mold-Resistant Type: On painted walls in rooms where tile is used.
5. Glass-Mat Water Resistant Backing Board: Behind ceramic wall tile.
6. Flexible Type: As indicated on Drawings. Apply in double layer at curved assemblies.
7. Abuse-Resistant Type: In corridors to 4 ft. AFF.

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.
   b. At high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
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 (400 mm) 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-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 recommendations 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- (300-mm-) 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 (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer’s written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Water-Resistant Backing Board: Install on painted walls in rooms receiving tile with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

C. 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 at locations indicated on Drawings and according to ASTM C 840.

C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. U-Bead: Use at exposed panel edges.

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.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for ceramic tile.
3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
   a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Glass-Mat Faced Panels: Finish according to manufacturer’s written instructions.
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 09 29 00
SECTION 09 30 00
TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Crack isolation membrane.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for slab finish below floor tile.
2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
3. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.


C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum Minimum 0.6.
1.5 ACTION SUBMITTALS

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

B. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.

2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches (300 mm) square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.

3. Full-size units of each type of trim and accessory for each color and finish required.

4. Metal edge strips in 6-inch (150-mm) lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of product, signed by product manufacturer.

C. Material Test Reports: For each tile-setting and -grouting product.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
   a. Obtain a written receipt from the Owner's representative to include in closeout documents.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Crack isolation membrane.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

B. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

C. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

D. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 MANUFACTURERS

A. Products: Basis of Specification are products noted in the Finishes Legend located at the end of the Finish Schedule.
B. Manufacturers: Subject to compliance with requirements, and properties of the specified products, including color selection, products by the following will be considered if submitted before Bids are received in accordance with the Instructions to Bidders:

1. Tile Products:
   b. Florida Tile Industries, Inc.
   c. Mannington Ceramic Tile.
   d. Monarch Tile, Inc.
   e. Quarry Tile Company.
   f. United States Ceramic Tile Company.

2.3 TILE PRODUCTS

A. Floor Tile: See Finishes Legend and Finish Schedule for type and location.

B. Wall Tile: See Finishes Legend and Finish Schedule for type and location.

C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:

1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
2. Shapes: As indicated on the Drawings or if not indicated, as follows, selected from manufacturer's standard shapes:
   a. Provide coved base at ceramic mosaic floor tile.
   b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
   c. External Corners for Thin-Set Mortar Installations: Surface bullnose.
   d. Internal Corners: Field-butted square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.
   e. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide a reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.35 mm) across nominal 4-inch (100-mm) dimension.

2.4 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.


1. Products: Subject to compliance with requirements, provide one of the following:
   a. Boiard Products; a QEP company; Elastiment 344 Reinforced Waterproofing and Anti-Fracture/Crack Suppression Membrane.
   b. Bonsal American; an Oldcastle company; B 6000 Waterproof Membrane with Glass Fabric.
   c. Bostik, Inc.; Hydroment Blacktop 90210.
2.5 SETTING MATERIALS

A. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1A and as specified below:

1. Latex additive (water emulsion) described below, serving as replacement for part or all of gaging water, of type specifically recommended by latex additive manufacturer for use with job-mixed portland cement and aggregate mortar bed.

   a. Latex Additive: Manufacturer’s standard.

B. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:

1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.

   a. For wall applications, provide nonsagging, latex-Portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.

2.6 GROUTING MATERIALS

A. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:

1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:

   a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.

2.7 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; Dow Corning 786.
   b. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
   d. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
   e. Tremco Incorporated; Tremasil 600 White.

D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

1. Provide at control joints in floors where indicated, or if not indicated, over control joints in substrates and at 30’ maximum spacing.
2. Products: Subject to compliance with requirements, provide one of the following:
   b. Degussa Building Systems; Sonneborn Sonolastic SL 2.
   c. Pecora Corporation; Dynatrol II-SG.
   d. Sika Corporation; Sikaflex-2c SL.
   e. Tremco Incorporated.; THC-900.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; white zinc alloy exposed-edge material.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Bonsal American; an Oldcastle company; Grout Sealer.
   b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
   c. C-Cure; Penetrating Sealer 978.
   d. Custom Building Products; Grout Sealer.
   e. Jamo Inc.; Penetrating Sealer.
   f. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout.
2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

   a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
   b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at project site before installing.
3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
   a. Tile floors in wet areas.
   b. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
   c. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/8 inch (3.2 mm).
2. Decorative Thin Wall Tile: 1/8 inch (3.2 mm).

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
J. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.5 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove epoxy and latex-Portland cement grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR TILE INSTALLATION SCHEDULE

A. Floor Tile Installation Over Concrete Slabs. Comply with the following:
   1. Tile Type: Ceramic Tile. Provide products according to the Finishes Legend at the end of the Finish Schedule.
   2. Provide according to TCA Installation Method F113, (Thinset).
      a. Latex portland cement mortar, ANSI A118.4.
      b. Latex portland cement grout, ANSI A118.6.
   3. Provide according to TCA installation method F112, (Bed set):
      a. Mortar Bed-ANSI A108.1A.
      b. Grout - ANSI A118.6 or A118.7.
   4. Provide according to TCA installation method B-417 (at shower rooms).

B. Ceramic Wall Tile over water, moisture and/or mold resistant gypsum backing board substrate: Comply with the following:
1. Tile Type: Ceramic wall tile. Provide products according to the Finishes Legend at the end of the Finish Schedule.
2. Provide according to TCA Installation Method W243.
   b. Latex Portland cement mortar, ANSI A118.4.
   c. Latex Portland cement grout, ANSI A118.6.

END OF SECTION 09 30 00
SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes acoustical and wood panels (interior and exterior) with exposed and
   concealed suspension systems for ceilings.

B. Related Sections include the following:
   1. Division 7 Section "Joint Sealants" for acoustical sealants.
   2. Division 9 Section "Linear Metal Ceilings" for base bid ceilings in lieu of wood slat
      ceilings.

1.3 DEFINITIONS

A. AC: Articulation Class.

B. CAC: Ceiling Attenuation Class.

C. LR: Light Reflectance coefficient.

D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

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

B. Samples for Verification: For each component indicated and for each exposed finish required,
   prepared on Samples of size indicated below.
   1. Acoustical Panel: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern,
      and texture.

C. Maintenance Data: For finishes to include in maintenance manuals.
1.5 QUALITY ASSURANCE

A. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

B. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:

2. "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings." Suspended acoustical ceiling systems shall be installed in accordance with the provisions of ASTM C 635, ASTM C 636 and the structural requirements in IBC Chapter 16 and ASCE 7 Section 13.5.6. Ceiling engineering done by the manufacturer and incorporated into their installations instructions is acceptable. For seismic design categories D through F there are more stringent requirements in ASCE 7 (IBC 803.9.1.1, 1613.1).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.6 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Products to comply with Greenguard™.

2.2 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 WATER-FELTED, MINERAL-BASE ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING APC-1

A. Products: Armstrong Fine Fissured #1729.

B. Classification: Provide panels complying with ASTM E 1264 for Type III, mineral base with membrane-faced overlay; Form 2, water felted.

C. Color: White.

D. LR: Not less than 0.84.

E. NRC: Not less than 0.50.

F. CAC: Not less than 35.

G. Edge Detail: Square.

H. Thickness: 5/8 inch.

I. Size: 24 by 48 inches.
2.4 WATER-FELTED, MINERAL-BASE ACOUSTICAL PANELS WITH MEMBRANE-FACED OVERLAY FOR ACOUSTICAL PANEL CEILING APC-2

A. Products: Armstrong Fine Fissured #605 "Ceramaguard Unperforated".

B. Classification: Provide panels complying with ASTM E 1264 for Type III, mineral base with membrane-faced overlay; Form 2, water felted.

C. Color: White.

D. LR: Not less than 0.80.

E. NRC: Not less than 0.10.

F. CAC: Not less than 35.

G. Edge Detail: Square.

H. Thickness: 5/8 inch (15 mm).

I. Size: 24 by 48 inches (610 by 1220 mm).

2.5 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers:

1. Armstrong World Industries, Inc.
2. Celotex Corporation; Architectural Ceilings Marketing Dept.
3. Chicago Metallic Corporation.
4. USG Interiors, Inc.

B. Roll-Formed Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

C. Products: See Finishes Legend.

2.6 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

E. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

F. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.

2.7 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

A. Manufacturers:

1. Armstrong World Industries, Inc.
2. Celotex Corporation
3. Chicago Metallic Corp.
4. USG Interiors, Inc.

B. Steel Suspension Systems:

1. "Prelude" 15/16".

2.8 LINEAR WOOD SLAT CEILING WITH CONCEALED CARRIERS AND ACOUSTICAL BACKING (WPC-1)

A. Basis-of-Specification product and manufacturer: Rulon Company “Panelized Linear Wood Panels”.

B. Finish: Clear.

C. Veneer Selection: Maple.

D. NRC: Not less than 0.65 (includes acoustical backing).

E. Dimension: 8" x 3-3/4" x ¾" w/3/4" reveal.

F. Fire Rating: Class A.

G. Suspension System:

1. Linear Wood Panels shall be suspended from standard heavy-duty 15/16" T-rail carriers using Rulon woodbacker clips for connection. #12-gauge wire hangers shall suspend T-rail carriers.
2. See drawings for location of removable grid.

I. Spacer: Fiber felt.

2.9 ACOUSTICAL SEALANT

A. Products: See Section 07 92 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

A. General: Install acoustical panel ceilings to comply with UBC Standard 25-2 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not attach hangers to steel deck tabs.
6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
7. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.66 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
   a. Pop rivets acceptable at 9/16" grid only. Painted to match grid.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 LINEAR WOOD PANELS

A. Panelized Linear Wood Panels: Assemble as shown in the Reflected Ceiling Plans: see drawings for location of reveals, removable grid and fully accessible panels. Panels shall be fastened together with woodbackers, positioned 5-1/2" from the ends and 12" on center, with overlapping attachment to the next panel for support of the system. Woodbackers shall be painted black. Direct screw connection through grid to woodbackers.

1. Woodbacker clips shall be used to suspend LinearWood Panels when removability of panels is necessary for access above the ceiling.

B. Edges, Borders and Perimeter Trims: All wood ceiling products specified shall be supplied by the ceiling manufacturer.

2. ½" space, typical, at wall perimeter where suspended wood ceiling is adjacent to a wall, soffit or another ceiling surface.
3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13
SECTION 09 54 23
LINEAR METAL CEILINGS

1.1 PERFORMANCE REQUIREMENTS

A. Wind Load: [20 lbf/sq. ft. (960 Pa)] [30 lbf/sq. ft. (1436 Pa)] [as indicated on Drawings] <Insert pressure>.

1.2 QUALITY ASSURANCE

A. Mockups for each form of construction and finish.

1.3 COMPONENTS

A. Moldings and trim.

B. Sound Absorption: [Fabric layer] [Plastic-wrapped, mineral-fiber insulation] [Unwrapped, glass-fiber insulation].

C. Seismic struts.

D. Hold-down clips.

E. Aluminum Pans and Suspension System:

1. Classification: [Perforated] [Unperforated].
2. Linear Module Width: [2 inches (51 mm)] [4 inches (102 mm)] [6 inches (152 mm)] [8 inches (203 mm)] <Insert dimensions>.
3. Pan Depth: [5/8 inch (16 mm)] [3/4 inch (19 mm)] [1 to 1-1/2 inches (25 to 38 mm)] <Insert depth>.
4. Pan Face Finish: [Mill] [Lacquered mill] [Clear anodized] [Clear mirror-anodized] [Painted] [Fluoropolymer coated] [Bright reflective] <Insert finish>.
5. Filler strip.
6. NRC: Not less than [0.65] [0.75] [0.95] <Insert NRC>.
7. Suspension-System Main-Carrier Material: [Aluminum] [Zinc-coated steel] [Hot-dip galvanized steel].

F. Access panels.

END OF SECTION 09 54 23
SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section Includes:
      1. Resilient base.
      2. Resilient molding accessories.
      3. Resilient stair accessories.
   B. Related Sections:
      1. Division 09 Section "Sheet Carpeting".
      2. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

1.4 MAINTENANCE MATERIAL SUBMITTALS
   A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
      1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE
   A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
      1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Basis of this Specification is Johnsonite for Wall Base and floor transitions. Color as indicated in the Finishes Legend at the end of the Finish Schedule. Subject to compliance with the requirements and properties of the product listed, including acceptable color and texture, products of other manufacturers will be considered if submitted prior to Bid in accordance with the stipulations in the Instructions to Bidders.

2.2 RESILIENT WALL BASE

A. Wall Base: ASTM F 1861.

B. Type (Material Requirement): TS (rubber, vulcanized thermoset) or TP (rubber, thermoplastic).

C. Group (Manufacturing Method): I (solid, homogeneous) or II (layered).

D. Style: Cove (with top-set toe).

E. Minimum Thickness: 0.125 inch (3.2 mm).

F. Height: 4 inches (102 mm).

G. Lengths: Coils in manufacturer's standard length.

H. Outside Corners: Job formed.

I. Inside Corners: Job formed.

J. Surface: Smooth.
2.3 VINYL BASE <Insert drawing designation>

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. Armstrong World Industries, Inc.
2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
3. Flexco.
5. Roppe Corporation, USA.
6. VPI, LLC, Floor Products Division.
7. <Insert manufacturer's name>.

B. Product Standard: ASTM F 1881, Type TV (vinyl, thermoplastic).

1. Group: [I (solid, homogeneous)] [II (layered)].
2. Style and Location:
   a. Style A, Straight: [Provide in areas with carpet] <Insert requirements>.
   b. Style B, Cove: [Provide in areas with resilient flooring] <Insert requirements>.

C. Minimum Thickness: [0.125 inch (3.2 mm)] [0.080 inch (2.0 mm)] <Insert dimension>.

D. Height: [2-1/2 inches (64 mm)] [4 inches (102 mm)] [6 inches (152 mm)] [As indicated on Drawings].

E. Lengths: [Cut lengths 48 inches (1219 mm) long] [Colls in manufacturer's standard length] [Cut lengths 48 inches (1219 mm) long or colls in manufacturer's standard length].

F. Outside Corners: [Job formed] [Preformed] [Job formed or preformed].

G. Inside Corners: [Job formed] [Preformed] [Job formed or preformed].

H. Colors and Patterns: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from full range of industry colors] <Insert colors and patterns>.

2.4 RUBBER STAIR ACCESSORIES <Insert drawing designation>

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. AB: American Biltrite.
2. Allstate Rubber Corp.
3. Armstrong World Industries, Inc.
4. Burke Mercer Flooring Products, Division of Burke Industries Inc.
5. Flexco.
10. PRF USA, Inc.
11. R.C.A. Rubber Company (The).
12. Roppe Corporation, USA.
13. VPI, LLC, Floor Products Division.
14. *<Insert manufacturer's name>.*

C. Stair Treads: ASTM F 2169.

1. Type: [TS (rubber, vulcanized thermostel)] or [TP (rubber, thermoplastic)].
2. Class: [1 (smooth, flat)] or [2 (pattern; embossed, grooved, or ribbed)].
3. Group: [1 (embedded abrasive strips)] or [2 (with contrasting color for the visually impaired)].
4. Nosing Style: [Square, adjustable to cover angles between 60 and 90 degrees] [Square] [Round].
5. Nosing Height: [1-1/2 inches (38 mm)] or [2 inches (51 mm)] or [2-3/16 inches (66 mm)]
   *<Insert dimension>.*
6. Thickness: [1/4 inch (6 mm) and tapered to back edge] *<Insert thickness>.*
7. Size: Lengths and depths to fit each stair tread in [one piece] [one piece or, for treads exceeding maximum lengths manufactured, in equal-length units].
8. Integral Risers: Smooth, flat; in height that fully covers substrate.

D. Separate Risers: Smooth, flat; in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Style: [Coved toe, 7 inches (178 mm) high by length matching treads] [Toeless, by length matching treads].
2. Thickness: [0.125 inch (3.2 mm)] [Manufacturer's standard] *<Insert thickness>.*

E. Stringers: Height and length after cutting to fit risers and treads and to cover stair stringers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Thickness: [0.125 inch (3.2 mm)] or [0.080 inch (2.0 mm)] [Manufacturer's standard]
   *<Insert thickness>.*

F. Landing Tile: [Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads] *<Insert requirements>.*

G. Locations: [Provide rubber stair accessories in areas indicated] *<Insert requirements>.*

H. Colors and Patterns: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from full range of industry colors] *<Insert colors and patterns>.*

2.5 FLOOR TRANSITIONS

A. Manufacturer: Johnsonite and Genotek.

B. See Finish Legend and drawings for specific products.
2.6 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
   1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

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

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.
   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
   1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
   2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet resilient floor covering that would otherwise be exposed.

C. Resilient Stair Accessories:
   1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
   2. Tightly adhere to substrates throughout length of each piece.
   3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 65 13
SECTION 09 65 16

RESILIENT SHEET FLOORING

1.1 PRODUCTS

A. Vinyl Sheet Flooring:
   1. Backing: [None, unbacked] [Fibrous] [Nonfoamed plastic] [Foamed plastic].
   2. Wearing Surface: [Smooth] [Embossed].
   3. Seamless-Installation Method: [Heat welded] [Chemically bonded] <Insert requirements>.

B. Installation Materials:
   1. Trowelable leveling and patching compounds.
   2. Adhesives: Low VOC.
   3. Integral-Flash-Cove-Base Accessories:
      a. Cove strip.
      b. Cap strip.
      c. Corners.
   4. Floor polish.

END OF SECTION 09 65 16
SECTION 09 65 19
RESILIENT TILE FLOORING

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
1. Vinyl composition floor tile (Base Bid).

B. Related Sections:
1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples for Verification: Full-size units of each color and pattern of floor tile required.
   1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.

1.4 CLOSEOUT SUBMITTALS
A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MATERIALS MAINTENANCE SUBMITTALS
A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE
A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation indicated.
1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.8 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Close spaces to traffic during floor tile installation.

C. Close spaces to traffic for 48 hours after floor tile installation.

D. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore Standard.

2.2 VINYL COMPOSITION FLOOR TILE VCT 1-5

A. Manufacturers: Basis of this Specification is Mannington "Essentials and Designer Essentials". Color as indicated in the Finishes Legend at the end of the Finish Schedule. Subject to compliance with the requirements and properties of the product listed, including acceptable color and texture, products of other manufacturers will be considered if submitted prior to Bid in accordance with the stipulations in the Instructions to Bidders.

2.3 VINYL COMPOSITION TILE – VCT-1 through 5.

A. Vinyl Composition Tile (VCT): ASTM F 1066.
B. Class: 2 (through-pattern tile).
C. Wearing Surface: Smooth.
D. Thickness: 0.125 inch (3.2 mm).
E. Size: 12 by 12 inches (305 by 305 mm).
F. Fire-Test-Response Characteristics:
G. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.

1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. VCT and Asphalt Tile Adhesives: Not more than 50 g/L.

2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
C. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
B. Concrete Substrates: Prepare according to ASTM F 710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
   a. Perform anhydrous calcium chloride test, ASTM F 1889. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
   b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are same temperature as space where they are to be installed.

   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

   1. Lay tiles square with room axis in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

   1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern) U.N.O.
   2. Lay tiles at 45 degree angle to corridor walls where shown on A-113, A-123.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer’s written instructions for cleaning and protection of floor tile.

B. Perform the following operations immediately after completing floor tile installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.
   1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive and surface blemishes if recommended in writing by manufacturer.
      a. Use commercially available product acceptable to manufacturer and as approved by the Owner’s maintenance service.

E. Joint Sealant: Apply sealant to resilient terrazzo floor tile perimeter and around columns, at door frames, and at other joints and penetrations.

F. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19
SECTION 09 65 20
RESILIENT PLANK FLOORING

1.1 PRODUCTS

A. Basis-of-Design Product: LG Hausys Floors "Deco Advantage Wood".

B. Description

1. Construction:
   a. Polyurethane top layer.
   b. Clear wear layer.
   c. High-Res image layer.
   d. Commercial flooring layer.
   e. Commercial backing layer.

2. Thickness: 120 mil.
3. Size: 7.09" x 36.22" (180 mm x 920 mm).
4. Recycled Content: 14%.

C. Installation Materials:

1. Trowelable leveling and patching compounds.
2. Adhesives.
4. Floor polish.

1.2 FLOOR TILE INSTALLATION

A. Lay tiles square with room axis.

END OF SECTION 09 65 20
SECTION 09 68 13
TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes modular, tufted carpet tile.

B. Related Sections include the following:

1. Division 9 Section "Resilient Tile Flooring and Base" for resilient wall base and accessories installed with carpet tile.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Existing flooring materials to be removed.
3. Existing flooring materials to remain.
4. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch-(300-mm-)long Samples.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.

E. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.7 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Wear: Lifetime of carpet. No more than 10% face yarn loss by weight in normal use.
2. Static: Lifetime of carpet.
3. Edge Ravel: Lifetime of carpet. Guaranteed no edge ravel in normal use. (No seam sealers required.)
5. Tuft Bind: Lifetime of carpet.
1.8 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Basis of this Specification is Tandas/C&A “Abrasive Action #02578” (EM-1). Subject to compliance with the requirements and properties of the product listed, including acceptable color and texture, products of other manufacturers will be considered if submitted prior to Bid in accordance with the stipulations in the Instructions to Bidders.

1. Carpet tile shall meet the testing and product requirements of the Carpet and Rug Institute Green Label Plus program.

B. Description:

1. Construction:
2. Face Weight:
3. Gauge:
4. Stitches per Inch:
5. Pile Height Average:
6. Fiber System:
7. Dye Method:
8. Soil/Stain Protection:
9. Primary Tufting Substrate:

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. VOC Limits: Provide adhesives with VOC content not exceeding 50 g/L.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.

2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet tile.

3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

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

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer’s written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer’s written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer’s written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer’s written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye lot integrity. Do not mix dye lots in same area.
D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

H. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protection of Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13
SECTION 09 68 16

 SHEET CARPETING

1.1 QUALITY ASSURANCE
   A. Mockups for each type of carpet [and carpet cushion] installation.

1.2 WARRANTY
   A. Carpet: [10] <Insert number> years.
   B. Carpet Cushion: [10] <Insert number> years.

1.3 PRODUCTS
   A. Tufted Carpet <Insert designation>:
      1. Fiber Content: [100 percent nylon 6, 6] [100 percent nylon 6] [100 percent polypropylene] <Insert fiber and content by percentage>.
      2. Pile Characteristic: [Level-loop] [Cut] [Cut-and-loop] [Multilevel-loop] [Level tip shear] [Random shear] [Frieze] [Sculptured] pile.
      3. Density: <Insert oz./cu. yd. (g/cu. cm)>.
      4. Pile Thickness: <Insert inches (mm)>.
      5. Face Weight: <Insert oz./sq. yd. (g/sq. m)>.
      6. Total Weight: <Insert oz./sq. yd. (g/sq. m)>.

   B. Woven Carpet <Insert designation>:
      1. Fiber Content: [100 percent wool] [80 percent wool; 20 percent nylon 6, 6] [80 percent wool; 20 percent nylon 6] <Insert fiber and content by percentage>.
      2. Face Construction: [Axminster] [Wilton] [Velvet].
      3. Pile Characteristic: [Level-loop] [Cut] [Cut-and-loop] pile.
      4. Density: <Insert oz./cu. yd. (g/cu. cm)>.
      5. Pile Thickness: <Insert inches (mm)>.
      6. Face Weight: <Insert oz./sq. yd. (g/sq. m)>.
      7. Total Weight: <Insert oz./sq. yd. (g/sq. m)>.

   C. Carpet Cushion <Insert designation>:
      1. Traffic Classification: [Moderate] [Heavy] [Extra-heavy] traffic.
      2. Material: [Fiber] [Rubber] [Polyurethane foam].
      3. Thickness: <Insert inches (mm)>.
      4. Emissions: Carpet cushion complies with CRI's "Green Label" program.
1.4 EXECUTION

A. Installation: [Carpet with attached cushion] [Carpet with preapplied adhesive] [Hook and loop] [Stretch in] [and] [Stair].

END OF SECTION 09 68 16
SECTION 09 72 00
WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Vinyl wall covering.

B. Related Sections:

1. Division 09 Section "Interior Painting" for priming wall surfaces.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.

C. Samples for Verification: Full width by 36-inch- (914-mm-) long section of wall covering.

1. Sample from same flitch to be used for the Work, with specified finish applied.

D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wall-Covering Materials: For each type, full-size units equal to 5 percent of amount installed.

1.7 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: As follows, per ASTM E 84:

   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2. Fire-Growth Contribution: Textile wall coverings tested according to NFPA 265 and complying with test protocol and criteria in the 2003 IBC.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Low-Emitting Materials: Wall covering system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 WALL COVERINGS

A. General: Provide rolls of each type of wall covering from same print run or dye lot.
2.3 VINYL WALL COVERING (VWC 1-4)

A. Vinyl Wall-Covering Standards: Provide mildew-resistant products complying with the following:

1. FS CCC-W-408D and CFFA-W-101-D for Type II, Medium-Duty products.
2. Products: Subject to compliance with requirements, provide the following:
   a. See Finishes Legend.

B. Total Weight Excluding Coatings: 21 oz./lin. Yd. (54").

C. Width: 50-55 inches.


1. Fiber Content: Polyester.

E. Repeat: Random.

F. Colors, Textures, and Patterns: See Finishes Legend.

2.4 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application; as recommended in writing by wall-covering manufacturer.

1. Adhesive shall have VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Primer/Sealer: Mildew resistant, complying with requirements in Division 09 Section "Interior Painting" or as recommended in writing by wall-covering manufacturer for intended substrate.

C. Metal Primer: Interior ferrous metal primer complying with Division 09 Section "Interior Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Comply with manufacturer’s written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
2. Metals: If not factory primed, clean and apply metal as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
4. Painted Surfaces: Treat areas susceptible to pigment bleeding.

D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.

E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated except where more stringent requirements apply.

B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.

D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.

E. Match pattern 72 inches (1830 mm) above the finish floor.

F. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 6 inches (150 mm) from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.

G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

H. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.
D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00
SECTION 09 91 13
EXTERIOR PAINTING

1.1 QUALITY ASSURANCE
A. Mockups for each color and finish.

1.2 PAINT, GENERAL
A. Products MPI listed.
B. VOC Content: Complying with LEED.

1.3 SOURCE QUALITY CONTROL
A. Testing: By Owner-engaged agency.

1.4 EXTERIOR PAINTING SCHEDULE
A. Steel Substrates:
   1. Water-based light industrial coating system.
   2. Alkyd system.
   3. Quick-drying enamel system.
   4. Aluminum paint system.

B. Galvanized-Metal Substrates:
   1. Latex system.
   2. Water-based light industrial coating system.
   3. Alkyd system.

END OF SECTION 09 91 13
SECTION 09 91 23

INTERIOR PAINTING

1.1 QUALITY ASSURANCE
   A. Mockups for each color and finish.

1.2 PAINT, GENERAL
   A. Products MPI listed.
   B. VOC Content: Complying with LEED.

1.3 SOURCE QUALITY CONTROL
   A. Testing: By Owner-engaged agency.

1.4 INTERIOR PAINTING SCHEDULE
   A. Steel Substrates:
      1. Latex over alkyd primer system.
      2. Water-based dry-fall system.
      3. Institutional low-odor/VOC latex system.
      4. High-performance architectural latex system.
      5. Water-based light industrial coating system.
      6. Alkyd system.
      7. Quick-drying enamel system.
      8. Alkyd dry-fall system.
      9. Aluminum paint system.

   B. Galvanized-Metal Substrates:
      1. Latex over waterborne primer system.
      2. Water-based dry-fall system.
      3. Institutional low-odor/VOC latex system.
      4. High-performance architectural latex system.
      5. Water-based light industrial coating over waterborne primer system.
      6. Aluminum paint system.

   C. Wood Substrates: Including wood trim architectural woodwork doors wood-based panel products.
      1. Transparent finish.

   D. Gypsum Board Substrates:
      1. Latex system.
      2. Institutional low-odor/VOC latex system.
3. High-performance architectural latex system.
4. Water-based light industrial coating system.
5. Alkyd over latex primer system.

END OF SECTION 09 91 23
SECTION 10 11 00
VISUAL DISPLAY SURFACES

PART 1 - GENERAL

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

1.2 SUMMARY
A. This Section the following:
   1. Porcelain enamel markerboards
   2. Cork faced tackboards
   3. Map rails, attached to markerboards and tackboards
B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 6 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds.

1.3 SUBMITTALS
A. Product Data: For each type of visual display board indicated. Include individual panel weights
   for sliding markerboard units.
B. Shop Drawings: For each type of visual display board required.
   1. Include dimensioned elevations. Show location of joints between individual panels where
   unit dimensions exceed maximum panel length.
   2. Include sections of typical trim members.
   3. Show anchors, grounds, reinforcement, accessories, layout and installation details.
C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and
   textures available for the following:
   1. Markerboards: Actual sections of porcelain enamel finish for each type of markerboard
      required.
D. Samples for Verification: Of the following products, show color and texture or finish selected. Where
   finishes involve normal color and texture variations, include sample sets showing the full
   range of variations expected. Prepare samples from the same material to be used for the Work.
   1. Visual Display Boards: Sample panels not less than 8-1/2 by 11 inches (215 by 280
      mm), mounted on the substrate indicated for the final Work. Include a panel for each
      type, color and texture required.
2. Aluminum Trim and Accessories: Samples of each finish type and color, on 6-inch- (150-
mm) long sections of extrusions and not less than 4-inch (100 mm) squares of sheet or
plate. Include sample sets showing the full range of color variations expected.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain visual display boards through one source from a single manufac-
turer.

B. Product Options: Drawings indicate size, profiles and dimensional requirements of visual dis-
play boards and are based on the products indicated. Other manufacturers’ products with equal
performance characteristics may be considered if submitted prior to Bid in accordance with the
stipulations in the Instructions to Bidders.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Archi-
tect's approval and only to the extent needed to comply with performance requirements.
Where modifications are proposed, submit comprehensive explanatory data to Architect
for review.

C. Fire Test Response Characteristics: Provide vinyl-fabric-faced tackboards with the following
surface-burning characteristics as determined by testing assembled materials composed of fac-
ings and backings identical to those required in this Section per ASTM E 84 by a testing and in-
specting agency acceptable to authorities having jurisdiction. Identify vinyl-fabric-faced tack-
boards with appropriate markings of applicable testing and inspecting agency.

1. Flame Spread: 25 or less.
2. Smoke Developed: 10 or less.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify field measurements before preparation of Shop Drawings and be-
fore fabrication to ensure proper fitting. Coordinate fabrication schedule with construction pro-
gress to avoid delaying the work.

1. Allow for trimming and fitting where taking field measurements before fabrication might
delay the work.

1.6 WARRANTY

A. General Warranty: The special porcelain enamel markerboard warranty specified in this Article
shall not deprive the Owner of other rights the Owner may have under other provisions of the
Contract Documents and shall be in addition to, and run concurrent with, other warranties made
by the Contractor under requirements of the Contract Documents.

B. Porcelain Enamel Markerboard Warranty: Submit a written warranty executed by manufacturer
agreeing to replace porcelain enamel markerboards that do not retain their original writing and
erasing qualities, become slick and shiny or exhibit crazing, cracking or flaking within the speci-
fied warranty period, provided the manufacturer’s written instructions for handling, installation,
protection and maintenance have been followed.

1. Warranty Period: Life of the building.
C. Warranty shall be endorsed by the Contractor and Installer guaranteeing to remove and replace porcelain enamel markerboards that fail as described above.

1. Warranty Period: Two years following Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Porcelain Enamel Markerboards:
   a. Best-Rite Chalkboard Co.
   b. Claridge Products and Equipment, Inc.
   c. Ghent Manufacturing, Inc.
   d. Greensteel, Inc.
   e. Lemco, Inc.
   f. PBS Supply, Inc.
   g. Nelson Adams Company

2. Tackboards:
   a. Best-Rite Chalkboard Co.
   b. Claridge Products and Equipment, Inc.
   c. Ghent Manufacturing, Inc.
   d. Greensteel, Inc.
   e. Lemco, Inc.
   f. PBS Supply, Inc.
   g. Nelson Adams Company

2.2 MATERIALS

A. Porcelain Enamel Markerboards: Balanced, high-pressure-laminated, porcelain enamel markerboards of 3-ply construction consisting of face sheet, core material and backing.

1. Face Sheet: 24-gauge enameling grade steel especially processed for temperatures used in coating porcelain on steel. Coat exposed face and edges with a 3-coat process consisting of primer, ground coat and color cover coat. Coat concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to steel at manufacturer's standard firing temperatures, but not less than 1200 deg F (649 deg C).

   a. Cover Coat (Markerboards): Provide manufacturer's standard, white, special writing surface with low gloss finish intended for use with erasable dry markers.
   b. Magnetic Surface: Provide inner layer of steel foil to allow magnetic hold on porcelain surface.

2. Core, Fixed Units: 3/8-inch (9.5 mm) thick, particleboard core material complying with requirements of ANSI A208.1, Grade 1-M-1.
B. Plastic-Impregnated-Cork Tackboard: ¾-inch (6-mm-) thick, plastic-impregnated cork sheet factory laminated to ¼-inch (6-mm-) thick hardboard backing.

1. Backing: Factory laminate cork face sheet under pressure to 3/8-inch (9.5-mm) thick fiberboard backing.
2. Color: See Finishes Legend.

2.3 ACCESSORIES

A. Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062-inch (1.57 mm) thick, extruded-aluminum allow, size and shape as indicated, to suit type of installation. Provide straight, single-length units. Keep joints to a minimum. Miter corners to a neat hairline closure.

1. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.
2. Map Rail: Furnish map rail at top of each unit complete with the following accessories:
   a. Display Rail: Provide continuous cork display rail 2 inches (50 mm) wide, as indicated, integral with map rail.
   b. End Stops: Provide one end stop at each end of map rail.
   c. Map Hooks: Provide 2 map hooks with flexible metal clips for every 48 inches (1220 mm) of map rail or fraction thereof.

2.4 FABRICATION

A. Porcelain Enamel Markerboards: Laminate facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.

1. Cut joints straight and true. Space joints symmetrically. Fit and match panels before shipment to provide a continuous, uniform writing surface.
2. Length: Furnish panels approximately equal in length with permissible variation not more than 3 inches (75 mm) in either direction of equal spacing. Allow ¾-inch (6.4-mm) clearance at trim in length and width for fitting. Provide lengths of panels in each space as follows:
   a. Up to 5 feet (1,524 m), 1 panel.
   b. More than 5 feet (1524 m) but less than 9 feet (2743 m), 2 panels.
   c. More than 9 feet (2743 m) but less than 13.5 feet (4115 m), 3 panels.
   d. More than 13.5 feet (4115 m) but less than 18 feet (5486 m), 4 panels.
   e. More than 18 feet (5486 m) but less than 22.5 feet (6858 m), 5 panels.
   f. More than 22.5 feet (6858 m) but less than 27 feet (8230 m), 6 panels.

B. Assembly: Provide factory-assembled markerboard and tackboard units, unless field-assembled units are required.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.
2. Provide manufacturer's standard vertical joint system between abutting sections of marker boards.
2.5 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designing aluminum finishes.

C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: Nonspecular as fabricated; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.

1. Surfaces to receive markerboards shall be free of dirt, scaling paint and projections or depressions that would affect smooth finished surfaces of markerboards.
2. Surfaces to receive tackboards shall be dry and free of substances that would impair the bond between tackboards and substrate.
3. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed panel size, provide two or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefet components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

B. Install units in locations and at mounting heights indicated and according to manufacturer's written instructions. Keep perimeter lines straight, plumb and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories necessary for complete installation.

C. Coordinate Project-site-assembled units with grounds, trim and accessories. Join parts with a neat, precision fit.

3.3 ADJUSTING AND CLEANING

A. Verify that accessories required for each unit have been properly installed and that operating units function properly.

B. Clean units according to manufacturer's written instructions.

END OF SECTION 10 11 00
SECTION 10 14 00
SIGNAGE

1.1 SUMMARY
A. Plaques (OFOI).
B. Dimensional characters (OFOI).
C. Panel signs (OFOI).

1.2 QUALITY ASSURANCE

1.3 WARRANTY
A. Materials and Workmanship: Five years.

1.4 PRODUCTS
A. Plaques:
   1. Cast Plaques: Bronze with rosette mounting.
B. Dimensional Characters:
   1. Cast Characters: Bronze with concealed stud mounting.
C. Panel Signs:
   1. Interior Panel Signs:
      a. Material: Laminated, etched photopolymer sheet with raised graphics and Braille.
      b. Frame: Unframed.
      c. Mounting: Wall with two-face tape.
      d. Color: As selected by Architect from manufacturer's full range.

1.5 FINISHES
A. Aluminum: Class I, color anodized.
B. Acrylic Sheet: Copy and background and frame colors that are UV and water resistant for five years.
1.6 INSTALLATION

A. Wall-Mounted Signs: Two-face tape.

B. Dimensional Characters: Manufacturer's standard flush mounting.

C. Cast-Metal Plaques: Manufacturer's standard concealed mounting.

END OF SECTION 10 14 00
SECTION 10 21 13

TOILET COMPARTMENTS

1.1 SUMMARY

A. HDPE toilet compartments configured as follows:
   1. Toilet-Enclosure Style: Overhead braced with floor anchor.
   2. Urinal-Screen Style: Wall hung, flat panel with floor anchor.

1.2 COMPONENTS

A. Brackets (Fittings):
   1. Full-Height (Continuous) Type: Stainless steel.

B. Hardware and Accessories: Stainless steel.

C. Solid Polymer Units (HDPE)
   1. Door and Panel Sizes:
      a. Thickness: 1 inch (min.).
      b. Height: 84 inches.
   2. Mounting Height: 6 inches AFF to bottom of doors and panels.

END OF SECTION 10 21 13
SECTION 10 21 16

SHOWER AND DRESSING COMPARTMENTS

1.1 SUMMARY

A. Solid-polymer shower compartments with dressing compartments.

1. Enclosure Style: Overhead braced.

1.2 COMPONENTS

A. Solid-Polymer Panels and Doors: HDPE; with stainless-steel heat-sink strip at exposed bottom edges, and with integral hinges.

B. Brackets (Fittings):

1. Full-Height (Continuous) Type: Clear-anodized aluminum.
2. Stirrup Type: Stainless steel.
3. Dressing-Compartment Brackets: Match toilet-compartment brackets specified in Section 102113 "Toilet Compartments."

C. Hardware and Accessories: Stainless steel.

D. Shower Compartment Openings: Provide with [doors] [headrail with hooks] [curtain rod with hooks] [headrail with hooks and curtain] [curtain rod with hooks and curtain].

E. Seats: [Fixed] [Folding] benches mounted on [enclosure panel] [wall] [or] [floor].

F. Door and Panel Sizes:

1. Thickness: 1 inch (min.)
2. Height: 84 inches.
3. Mounting Height: 6 inches AFF to bottom of doors and panels.

END OF SECTION 10 21 16
SECTION 10 26 00
WALL AND DOOR PROTECTION

1.1 WARRANTY
A. Materials and Workmanship: Five years.

1.2 PRODUCTS
A. Corner Guards:
   1. Surface mounted, resilient plastic type.
B. Impact-Resistant Wall Coverings:

END OF SECTION 10 26 00
SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

1.1 WARRANTY

A. Silver Spoilage for Mirrors: 15 years.

1.2 PRODUCTS

A. Public-Use Washroom Accessories:
   1. Toilet Tissue Dispenser: OFCI.
   2. Paper Towel Dispenser: OFCI.
   3. Waste Receptacle: OFCI.
   4. Liquid-soap dispenser: OFCI.
   5. Grab bar.
   7. Sanitary-napkin disposal unit.
   8. Mirror unit.

B. Private-Use Bathroom Accessories:
   1. Toilet tissue dispenser: OFOI.
   2. Robe hook.
   3. Shower curtains, rods and hooks.

C. Underlavatory guards.

D. Custodial Accessories:
   1. Utility shelf.
   2. Mop and broom holder.

END OF SECTION 10 28 00
SECTION 10 44 13
FIRE-EXTINGUISHER CABINETS

PART 1 - GENERAL

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

1.2 SUMMARY
A. Includes:
1. Fire-protection cabinets for the following:
   a. Portable fire extinguishers.
2. Fire-protection accessories.

1.3 SUBMITTALS
A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.

1. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Samples for Verification: For each type of exposed cabinet finish required, prepared on samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. Size: 6-by-6-inch (150-by-150-mm) square samples.

1.4 QUALITY ASSURANCE
A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."

C. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Fire Extinguisher Cabinets:
   a. J.L. Industries, Inc.
   b. Larsen's Manufacturing Company.
   c. Potter-Roemer; Div. of Smith Industries, Inc.

   a. 1-Hour Fire Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- (1.1-mm) thick, cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm) thick, fire-barrier material. Provide factory-drilled mounting holes.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

2. Extruded Shapes: ASTM B 221 (ASTM B 221M).

2.3 FIRE-PROTECTION CABINETS

A. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

2. Shelf: Same metal and finish as cabinet.

B. Cabinet Type: Suitable for the following:

1. Fire extinguisher.

C. Cabinet Mounting: Suitable for the following mounting conditions:

1. Semirecessed: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated.

D. Cabinet Trim Style: Fabricate cabinet trim in one piece with rolled edges.
1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
   a. Rolled-Edge Trim: 2-1/2-inch (64-mm) backbend depth.

E. Cabinet Trim Material: Manufacturer's standard, as follows:
   1. Aluminum sheet.

F. Door Material: Manufacturer's standard, as follows:
   1. Aluminum sheet.

G. Door Glazing: Manufacturer's standard, as follows:
   1. Tempered Break Glass: ASTM C 1048, King FT, Condition A, Type I, Quality q3, 1.5 mm.

H. Door Style: Manufacturer's standard design, as follows:
   1. Vertical duo panel with frame.

I. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
   1. Provide minimum 1/2-inch- (13-mm-) thick door frames, fabricated with tubular stiles and rails, and hollow-metal design.
   2. Provide inside latch and lock for break-glass panels.

J. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

2.4 ACCESSORIES

A. Break-Glass Strike: Provide manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.

B. Lettered Door Handle: Provide one-piece, cast-iron door handle with the work "FIRE" embossed into face.

C. Door Locks: Provide emergency release cam-lock based design, "Larsen Lock".

D. Identification: Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location. Locate as indicated by Architect.
   1. Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER" applied to door.
      b. Lettering Color: Red.
      c. Orientation: Vertical.
2.5 FINISHES, GENERAL

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

B. Appearance of Finished Work: 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 the 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.

2.6 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: Nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets are to be installed.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing fire-protection specialties.

B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. Prepare recesses for cabinets as required by type and size of cabinet and trim style.
2. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust cabinet doors that do not swing or operate freely.

B. Refinish or replace cabinets and doors damaged during installation.

C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10 44 13
SECTION 10 44 16
FIRE EXTINGUISHERS

1.1 SUMMARY
   A. Owner-Furnished Material: Hand-carried fire extinguishers. (OFOI)

1.2 QUALITY ASSURANCE
   A. Fire Extinguishers: NFPA 10.

1.3 WARRANTY
   A. Materials and Workmanship: Six years.

1.4 PRODUCTS
   A. Portable, Hand-Carried Fire Extinguishers:
      1. Multipurpose dry-chemical type, manufacturer's standard container.
      2. Purple K chemical type, manufacturer's standard container.
   B. Mounting Brackets: Steel with identification lettering.

END OF SECTION 10 44 16
SECTION 10 50 00
MISCELLANEOUS SPECIALTIES

1.1 SUMMARY

A. This Section includes the following:

1. Gas fireplace insert.
2. TV mounting brackets (OFOI).
3. Skateboard deterrent.
4. Knox Box (OFOI).

B. Related Sections include the following:

1. Division 9 Section "Gypsum Board Assemblies" for backing and blocking for surface mounted items and equipment.

END OF SECTION 10 50 00
SECTION 10 55 00
POSTAL SPECIALTIES

1.1 SUMMARY
A. Postal specialties for locations with private mail delivery and collection.
B. Accessories.

1.2 WARRANTY
A. Materials and Workmanship: Five years.

1.3 PRODUCTS
A. Private-Delivery Horizontal Mail Receptacles: Rear loading with door and lock.
   2. Compartment-Door Locks: [Cylinder] [Removable-core type furnished by Owner]
      [Spring-latch keyed to building keying system] [Combination].
   4. Quantity: At least 180 compartments (1 per room minimum).
   5. Mounting Height: Top at 6 feet AFF.

END OF SECTION 10 55 00
SECTION 11 31 00

RESIDENTIAL APPLIANCES

1.1 SUMMARY

A. This Section includes the following appliances:

1. Range and oven (OF/OI).
2. Range hood (CF/CJ).
4. Dishwasher in Servery (CF/CJ).
5. Microwave (OF/OI).
6. Garbage disposal (see mechanical).
7. Laundry Equipment (OF/OI).

1.2 SUBMITTALS

A. Product Data: For each appliance type required indicating compliance with requirements. Include complete operating and maintenance instructions for each appliance.

1.3 PRODUCTS AND MANUFACTURERS

1.4 EXAMINATION

A. Examine roughing-in for plumbing, mechanical, and electrical services, with Installer present, to verify actual locations of services before residential appliance installation.

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

1.5 INSTALLATION

A. General: Comply with manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

1.6 ADJUSTING AND CLEANING

A. Test each item of residential appliances to verify proper operation. Make necessary adjustments.

END OF SECTION 11 31 00
SECTION 11 52 13

PROJECTION SCREENS

1.1 MATERIALS

A. Manually and Motor Operated Projection Screens:
   1. Bracket-mounted or ceiling-suspended, metal-encased screens.

B. Front-Projection Screen Material: Matte-white viewing surface.
   1. Size: (Manual) 50 by 50 inches (1270 by 1270 mm) in Conference Room. (Motorized) 96 x 96 inches (2438 x 2438 mm) in Great Room.

END OF SECTION 11 52 13
SECTION 12 24 13
ROLLER WINDOW SHADES

1.1 PRODUCTS

B. Roller Mounting Configuration: [Single roller] [Double roller, side by side] [Double roller, offset with outside roller over and inside roller under] [Manufacturer's standard for skylight shade operating mechanism indicated] <insert requirements>.

C. Installation Accessories: [Front fascia] [Exposed headbox] [Recessed shade pocket] [Closure panel and wall clip] [Side channels and bottom (sill) channel or angle].


1. Light-Filtering Fabric: [PVC-coated fiberglass] [PVC-coated polyester] [Woven PVC-coated fiberglass and PVC-coated polyester] [Woven polyester and PVC-coated polyester] [Acrylic-coated fiberglass] [PVC-coated fiberglass with silver backing] <insert description>.

2. Light-Blocking Fabric: [Fiberglass textile with PVC film bonded to both sides] [Fiberglass with acrylic backing] [Acrylic-coated fiberglass] [Polyester-cotton blend] [Polyester with foamed-acrylic backing] [PVC-coated fiberglass with bonded PVC film] <insert description>.

E. Product Safety Standard: WCMA A 100.1.

1.2 INSTALLATION
A. [Between (inside)] [Outside of] jamb installation.

B. Factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motorized operators for roller shades.

END OF SECTION 12 24 13
SECTION 12 36 61
SIMULATED STONE COUNTERTOPS

1.1 SOLID-SURFACE-MATERIAL COUNTERTOPS

A. Front: [Straight, slightly eased edge] [Beveled] [Bullnose] [Radius edge with apron] [Laminated bullnose] [Wood-trimmed edge].

B. Backsplash[ and Endsplash]: [Eased] [Beveled] [Radius] edge.

C. Countertops: [1/2-inch- (12.7-mm-)] [3/4-inch- (19-mm-)] thick, solid surface material.

D. Countertops: 1/4-inch- (6.4-mm-) thick, solid surface material laminated to particleboard.

1.2 COUNTERTOP MATERIALS

A. FSC-certified wood materials.

B. No urea formaldehyde.

C. Low-emitting [adhesives] [and] [composite wood materials] for LEED for Schools.

D. Recycled content in particleboard.

END OF SECTION 12 36 61
SECTION 12 48 13

FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Carpet-type mats and recessed frames.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete work, including forming, placing, and finishing concrete floor slabs, and for concrete materials for grouting and filling around and under recessed mats and frames.
2. Division 9 Section "Carpet" for tufted carpet.

1.3 SUBMITTALS

A. Product Data: Include manufacturer's specifications and installation instructions, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of floor mat and frame specified.

B. Shop Drawings: For floor mats and frames. Show assembly, joint locations, installation details, layout, plans, elevations, sections, details of patterns or designs, accessories, anchors, and attachments to other Work.

C. Samples for Verification: 12-inch (300-mm) square assembled sections of floor mats, frame members, and treads rails with selected tread surface showing each type of metal finish and color of exposed floor mats, treads rails, frames, and accessories required.

D. Maintenance Data: For cleaning and maintaining floor mats to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain floor mats and frames through one source from a single manufacturer.
1.5 PROJECT CONDITIONS

A. Field Measurements: Verify blocked-out openings in floors by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

A. Coordinate size and location of oversized recesses in concrete work to receive floor mats and frames. Defer frame installations until building enclosure is completed and related interior finish work is in progress. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate integral installation of recessed frames and anchors with placing of concrete slab so frames are positioned accurately.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Type Mat: Equal to 10 percent of amount installed for each type indicated.

PART 2 - PRODUCTS

2.1 ENTRANCE MATS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

C. Basis-of-Design Product: Subject to compliance with requirements, provide Van Dijk "Hercules NOP Continuum" or a comparable product by one of the following:

1. American Floor Products Company, Inc.
2. Balco, Inc.
3. Consolidated Plastics Company, Inc.
5. Flexco.
6. Pawling Corporation; Architectural Products Division.
7. U.S. Mat & Rubber Corporation.
8. Van Dijk.

D. Carpet-Type Mats: Nylon carpet bonded to flexible rubber backing to form mats with nonraveling edges.

2. Widths: See Plan.
3. Face Weight: 52 oz/sq. yd.
5. Total Weight: 93 oz/sq. yd.
6. Pile Height: .400 (variable).
7. Total Height: .500 (variable).
8. Face Fiber: Blend of DPF solution dyed nylon, UV stabilized.

2.2 METAL FRAME MATERIALS

   1. Manufacturer: Amaro.
   3. Finish: Mill #405.

2.3 CONCRETE FILL AND GROUT MATERIALS

A. Provide concrete materials complying with Division 3 for grout and fill around and under recessed mats and frames that produce concrete equivalent in strength to cast-in-place concrete slabs. For concrete fill, adjust aggregate size to not exceed one-third fill thickness.

2.4 FABRICATION

A. General: Where possible, verify sizes by field measurement before shop fabrication.

B. Floor Mats: Shop fabricate units to greatest extent possible in sizes as indicated. If not otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

C. Recessed Metal Mat Frames: Extruded aluminum, of size and style to fit floor mat type specified, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.
   1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

D. With manufacturer's standard protective coating, coat surfaces of aluminum frames that will contact cementitious material.

2.5 FINISHES, GENERAL

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

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2.6 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, floor conditions, and floor recesses for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.

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

3.2 INSTALLATION

A. Install recessed mat frames to comply with manufacturer's written instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat.

1. Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.

2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.3 PROTECTION

A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

B. Defer installation of floor mats until Project is near Substantial Completion.

END OF SECTION 12 48 13
SECTION 14 21 00

ELECTRIC TRACTION ELEVATORS

1.1 SUMMARY

A. Electric traction passenger elevators.

1.2 WARRANTY

A. Elevator Work: <Insert warranty period>.

1.3 ELEVATORS

A. Basis-of-Design Product: Otis Gen2® gearless traction passenger elevator with Machine Room-less application.
B. Equipment Control: Elevonic® Control System.
C. Drive: Regenerative
D. Quantity of Elevators: 2
E. Elevator Stop Designations: 1, 2, 3, 4, 5
F. Stops: 5
G. Openings: 5 at Front, 0 at Rear.
H. Rise: 48 ft 0 in 0
I. Rated Capacity: 3500lbs
J. Rated Speed: 350 feet/minute.
K. Clear Inside Dimensions: 6' 8" x 5' 4 13/16"
L. Cab Height: 8' 0"
M. Door Height: 7' 0"
N. Entrance Type and Width: Single Slide; 3' 6"
O. Main Power Supply: 480 Volts + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.
P. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
Q. Machine Location: Inside the hoistway at the top of the hoistway.
R. Signal Fixtures: Manufacturer’s standard with metal button targets.
S. Controller Location: Controller(s) shall be located adjacent to the hoistway at the top landing in a control room.
T. Performance:
   1. Car Speed: ± 3 % of contract speed under any loading condition or direction of travel.
   2. Car Capacity: Safely lower, stop and hold up to 125% of rated load. (code required)
U. Ride Quality:
   1. Vertical Vibration (maximum): 12 – 17 milli-g
   2. Horizontal Vibration (maximum): 10 – 15 milli-g
   3. Vertical Jerk (maximum): 4.6 ± 1.0 ft./sec³ (1.4 ± 0.3 m/sec³)
   4. Acceleration/Deceleration (maximum): 1.98 ± .33 ft./sec² (0.6 ± 0.13 m/sec²)
   5. In Car Noise: 50 – 60 dB(A)
   6. Stopping Accuracy: ± 0.2 in. (± 5 mm)
   7. Re-leveling Distance: ± 0.4 in. (± 10 mm)

V. Operation: Duplex Collective Operation.

W. Operating Features – Standard
   1. Full Collective Operation
   2. Anti-nuisance.
   3. Fan and Light Protection.
   4. Load Weighing Bypass.
   5. Independent Service.
   7. Firefighters’ Service Phase I and Phase II.
   8. Top of Car Inspection.

X. Operation Features

Y. Door Control Features:
   1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.

   2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.

   Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.

   3. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

Z. Provide equipment according to seismic zone: Zone 2

1.4 WARRANTY

   A. 2 year parts and labor.

END OF SECTION 14 21 00