

**SECTION 02 41 19 - SELECTIVE STRUCTURE DEMOLITION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Salvage of existing items to be reused or returned to Owner.
- B. Related Sections include the following:
  - 1. Division 01 Section "Summary" for use of premises, and phasing, and Owner-occupancy requirements.
  - 2. Division 01 Section "Temporary Barriers and Enclosures" for temporary construction and environmental-protection measures for selective demolition operations.
  - 3. Division 01 Section "Cutting and Patching" for cutting and patching procedures.

**1.3 DEFINITIONS**

- A. Relocate: Detach items from existing construction, move to new location on site or within building, reset equipment in new location in accordance with equipment manufacturer's recommendations and tolerance.
  - 1. When manufacturer data is not available from Owner, comply with best practices and traditional standards for such installation.
- B. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
  - 1. For heavy machinery items to be demolished, disposition of equipment is at the discretion of the Contractor.
- C. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- D. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- E. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

**1.4 MATERIALS OWNERSHIP**

- A. Functional objects including, but not limited to, directories, signs, setback thermostats, shelving, television brackets and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

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1.5 SUBMITTALS

- A. Qualification Data: For demolition firm, professional engineer and refrigerant recovery technician.
- B. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Locations of proposed dust- and noise-control temporary partitions and means of egress, including for other spaces affected by selective demolition operations.
  - 6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
  - 7. Means of protection for items to remain and items in path of waste removal from building.
- C. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.
- D. Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
- E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
  - 1. Comply with requirements specified in Division 01 Section "Summary."
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - 1. Before selective demolition, Owner will remove the following items:
    - a. Loose furniture and furnishings.
    - b. Miscellaneous furniture and furnishings may remain. These shall be disposed of as part of the selective structure demolition work.

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2. Site limitations and space available for work are all unchanged from the time of inspection of the bidding. No additional payments will be made for claims related to conditions obvious at the time of bidding.
  - C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
  - D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
    1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
  - E. Storage or sale of removed items or materials on-site is not permitted.
  - F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
    1. Maintain fire-protection facilities in service during selective demolition operations.
- 1.8 WARRANTY
- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials or undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."
- C. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

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- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
- G. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
  - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
    - a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Division 01 Sections "Temporary Facilities and Utilities" and "Safety."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Utilities" and "Temporary Barriers and Enclosures."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  5. Maintain adequate ventilation when using cutting torches.
  6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  9. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to Owner.
  4. Transport items to Owner's storage area on-site designated by Owner.
  5. Protect items from damage during transport and storage.
- C. Salvaged Items:
1. Fire Extinguishers.
  2. AEC equipment and cabinet.
  3. Room/ Identification signage.
  4. Door Hardware/ cores (verify extent with owner)
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Items to be Removed and Reinstalled:
1. AED Equipment.
  2. Fire extinguishers.

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- F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- C. Precast Concrete: Saw cut in sections and lower from steel beams in a controlled manner. Do not hammer to dislodge or break into smaller sections.
- D. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- E. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- F. Resilient Floor Coverings: Remove non-asbestos containing floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
  - 1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
- G. Roofing: Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight. Refer to Division 07 Section "Roofing" for new roofing requirements.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
  - 2. Remove existing roofing system down to substrate where complete removal is required.
  - 3. Remove existing roofing system down to base ply where patching to new is required..
- H. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 4. Comply with requirements specified in Division 01 Section "Construction Waste Management and Cleaning."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 02 41 19**

## **SECTION 06 10 00 - ROUGH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Wood blocking and nailers.
  - 2. Plywood backing panels.

#### **1.2 SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product.
  - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
  - 1. Fire-retardant-treated wood.

### **PART 2 - PRODUCTS**

#### **2.1 WOOD PRODUCTS, GENERAL**

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Provide dressed lumber, S4S, unless otherwise indicated.

#### **2.2 FIRE-RETARDANT-TREATED MATERIALS**

- A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
  - 1. Use Exterior type for exterior locations and where indicated.
  - 2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
  - 3. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings, and the following:
  - 1. Concealed blocking.
  - 2. Plywood backing panels.

#### **2.3 MISCELLANEOUS LUMBER**

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:



1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

#### 2.4 PLYWOOD BACKING PANELS

- A. Backing Panels: DOC PS 1, Exterior, AC, moisture-resistant, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

#### 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code.

**END OF SECTION 06 10 00**

**SECTION 07 21 00 – THERMAL INSULATION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Extruded polystyrene foam-plastic board insulation

**1.3 ACTION SUBMITTALS**

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

**1.4 INFORMATIONAL SUBMITTALS**

- A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Research Reports: For foam-plastic insulation, from ICC-ES.

**1.5 DELIVERY, STORAGE, AND HANDLING**

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

## PART 2 - PRODUCTS

### 2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Extruded Polystyrene Board, Type IV: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E84.
  - 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. DiversiFoam Products.
    - b. Dow Chemical Company (The).
    - c. Kingspan Insulation Limited.
    - d. Owens Corning.
  - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
  - 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

## PART 3 - EXECUTION

### 3.1 PREPARATION

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

### 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

### 3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

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

3.4 PROTECTION

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

END OF SECTION

## SECTION 072500 - WEATHER BARRIERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Weather barriers
  - 2. Weather barrier flashing and accessories

#### 1.2 DEFINITIONS

- A. Weather Barrier: A combination of materials and accessories that do the following:
  - 1. Prevent the accumulation of water as a water-resistive barrier.
  - 2. Minimize the air leakage into or out of the building envelope as a continuous air barrier.
  - 3. Provide sufficient water vapor transmission to enable drying as a vapor-permeable membrane.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For weather barrier, include data on air and water-vapor permeance based on testing in accordance with referenced standards.
- B. Shop Drawings: Show details of weather barrier at terminations, openings, and penetrations. Show details of flexible flashing applications.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For weather barrier, from ICC-ES.
- B. Manufacturer's Instructions: For installation of each product specified.
- C. Reports: Field test and inspection reports.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store near heat source or open flame.

#### 1.6 WARRANTY

- A. Manufacturer's Product Warranty: To repair or replace weather barrier product that fails in materials within specified warranty period.
  - 1. Warranty Period: 10 years from date of purchase.

PART 2 - PRODUCTS

2.1 WEATHER BARRIER

- A. Commercial Building Wrap: ASTM E2357 passed, ABAA (Air Barrier Association of America) evaluated air barrier assembly, and assembly water resistance per ASTM E331; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized for nine-month exposure; and acceptable to authorities having jurisdiction.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek CommercialWrap or comparable product by another manufacturer to be reviewed by Architect.
  2. System Description, Single-Layer Weather Barrier: Single-layer weather barrier, including flashing and sealing of penetrations and seams. Retain "Drainability" Subparagraph below only when DuPont's "Tyvek CommercialWrap" or "Tyvek CommercialWrap D" are part of the weather barrier system; otherwise, delete.
  3. Drainability:
    - a. 90 percent or greater when tested in accordance with ASTM E2273
  4. Air Permeance, Product: Not more than 0.004 cfm/sq. ft. at 1.57 lbf/sq. ft. when tested in accordance with ASTM E2178.
  5. Water Penetration Resistance, Product: Hydrostatic head resistance greater than 22 inches in accordance with AATCC 127.
  6. Water-Vapor Permeance: Not less than 23 perms per ASTM E96/E96M, Desiccant Method (Procedure A) or not less than 28 perms per ASTM E96/E96M, Water Method (Procedure B).
  7. Allowable UV Exposure Time: Not less than 9 months (270 days) when tested in accordance with ASTM G155 (Accelerated Weathering).
  8. Flame Propagation Test: Materials and construction shall be as tested in accordance with NFPA 285.
  9. Heat and Visible Smoke Release Rates: Maximum rates in accordance with NFPA 285.
    - a. Peak Heat Release: 13,217 Btu/sq. ft.
    - b. Total Heat Release: 1762 Btu/sq. ft.
    - c. Effective Heat of Combustion: 7744 Btu/lb
  10. Weather barrier system to have a VOC content of 30 g/L or less.

2.2 WEATHER BARRIER FLASHING

- A. Weather Barrier Flashing

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1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; DuPont™ FlexWrap™ or comparable product by other manufacturers per review by Architect
  2. Conformability: Able to create a seamless sill pan extending up the jambs without cuts, patches, or fasteners.
  3. Water Penetration: No leakage at 15 psf per ASTM E331.
  4. Low Temperature Adhesion: Exceeds minimum value of 1.5 lb./in. at 25 deg F (minus 4 deg C) as Class A (without primer use).
  5. Adhesion After Water Immersion: Exceeds minimum value of 1.5 lb./in., after AAMA 800, Sections 2.4.1.3.1/2.4.1.4.3, Test B.
- B. Strip Flashing: Composite flashing material composed of spunbonded polyethylene laminate with 100 percent butyl-based, dual-sided, adhesive layer; AAMA 711, Class A (no primer), Level 3 thermal exposure, 176 deg F for seven days.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; DuPont™ StraightFlash™ or comparable product
  2. ASTM E331 applies to water penetration testing of exterior windows, skylights, doors, and curtain walls.
  3. Water Penetration: No leakage at 15 psf per ASTM E331.
  4. Low Temperature Adhesion: Exceeds minimum value of 1.5 lb./in. at 25 deg F as Class A without primer use.
  5. Adhesion After Water Immersion: Exceeds minimum value of 1.5 lb./in., after AAMA 800, Sections 2.4.1.3.1/2.4.1.4.3, Test B.

2.3 WEATHER BARRIER ACCESSORIES

- A. Building Wrap Tape: Pressure-sensitive plastic tape recommended by weather barrier manufacturer for sealing joints and penetrations in commercial building wrap.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek® Tape or comparable product.
- B. Fasteners with Self-Gasketing Washers: Commercial building wrap manufacturer's recommended pneumatically or hand-applied fasteners with minimum 1-inch diameter, high-density polyethylene cap washers with UV inhibitors.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek® Wrap Caps or comparable product.
- C. Primer for Flashings: Synthetic rubber-based product; spray applied. Strengthen adhesive bond at low temperature applications between weather products such as self-adhered flashing products, commercial building wraps, and common building sheathing materials.
1. Peel Adhesion Test: Passes in accordance with ASTM D3330, Test Method F, for the following.

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- a. Peel Angles: 0, 25, 72, and 180 degrees.
  - b. Substrates: Concrete masonry units (CMUs), exterior gypsum sheathing, oriented strand board (OSB), aluminum, and vinyl.
- 2. Chemical Compatibility: Pass; AAMA 713.
  - 3. Flame Spread Index: 5; ASTM E84.
  - 4. Smoke Development Index: 0; ASTM E84.

PART 3 - EXECUTION

3.1 COMMERCIAL BUILDING WRAP INSTALLATION

- A. General: Comply with weather barrier manufacturer's written installation guidelines and warranty requirements.
- B. Weather barrier to be securely fastened to framing
  - 1. Maintain continuity of air and water barrier assemblies.
  - 2. Start weather barrier installation at a building corner, leaving 12 inches of weather barrier extended beyond corner to overlap.
  - 3. Install weather barrier horizontally starting at lower portion of wall surface.
  - 4. Provide minimum 6 inches overlap at horizontal- and vertical-wrap seams in a shingle manner to maintain continuous downward drainage plane and air and water barrier.
- C. Seams: Seal seams with building wrap tape per manufacturer's recommended installation instructions.
  - 1. Shiplap horizontal seams in weather barrier to facilitate proper drainage.
- D. Fasteners: Use weather barrier manufacturer's recommended fasteners to secure weather barrier and install fasteners according to weather barrier manufacturer's installation guidelines.
  - 1. Do not use temporary fasteners to permanently attach weather barrier.
  - 2. Do not place fasteners with gasketing washers where weather barrier flashing will be installed.
  - 3. Install fasteners with gasketing washers through flashing where recommended by manufacturer.
- E. Openings: Completely cover openings with weather barrier, then cut weather barrier membrane to openings in accordance with weather barrier manufacturer's installation guidelines.
  - 1. Provide head and jamb flaps and seam overlaps to maintain continuous drainage.
  - 2. Repair damage to weather barrier using method recommended by weather barrier manufacturer.
  - 3. Install flashing in accordance with weather barrier manufacturer's installation guidelines.

3.2 WEATHER BARRIER FLASHING INSTALLATION

- A. Installation: Remove wrinkles and bubbles, reposition weather barrier as necessary to produce a uniform, smooth surface.



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1. Ensure that ambient and substrate surface temperatures are acceptable in accordance with manufacturer instructions and recommendations.
  2. Wipe surfaces to remove moisture, dirt, grease and other debris that could interfere with adhesion.
  3. Apply weather barrier manufacturer's recommended primer over concrete, masonry, and glass-mat gypsum wall sheathing substrates to receive weather barrier flashing.
  4. Lap weather barrier flashing a minimum of 2 inches onto weather barrier.
  5. Apply pressure over entire surface using roller or firm hand pressure
- B. Rough Openings: Shiplap flashing with weather barrier in a shingle manner to maintain a continuous downward drainage plane and air and water barrier in accordance with manufacturer's written instructions.
1. Apply 6-inch wide conformable weather barrier flashing at door and window sills.
  2. Ensure that sill flashing does not slope to the interior.
  3. Install backer rod in joint between frame of opening product and flashed rough opening on the interior.
  4. Apply sealant or closed-cell polyurethane foam insulation around entire opening/fenestration product to create air seal around interior perimeter of window openings in accordance with weather barrier manufacturer's instructions.
  5. Around door and window openings, apply butyl-based flashing to flaps of weather barrier.
  6. Use strip flashing with wrap cap screws to secure head flap of the windows.
- C. Penetrations: Apply weather barrier manufacturer's recommended weather barrier flashing patches behind fastening plates, such as brick-tie base plates, metal-flashing clips, and metal channels.
1. Seal weather barrier around each penetration with weather barrier manufacturer's recommended self-adhered flashing product or sealant. Integrate products with flanges into the weather barrier.
- D. Terminations: Provide minimum 2 inches overlap using strip flashing on adjoining roof and base of wall systems to maintain continuous downward drainage plane.
1. Secure weather barrier with fasteners and weather barrier flashing.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to train installers and observe subject test-wall areas and installations.
1. Air Infiltration Whole Building: ASTM E779 at not more than 0.25 cfm/sf at 1.57 lb/sq. ft.
  2. Water Penetration: ASTM E1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 10.0 lbf/sq. ft. . No water penetration shall occur as defined in ASTM E1105.
- B. Prepare test and inspection reports.

### 3.4 CLEANING

- A. Immediately remove release paper and scrap from work area and dispose of material

3.5 PROTECTION

A. Protect installed weather barrier from the following:

1. Damage from cladding, structure, or a component of the structure (for example, window, door, or wall system).
2. Contamination from building site chemicals, premature deterioration of building materials, or nonstandard use or application of products.
3. Foreign objects or agents, including the use of materials incompatible with weather barrier products.
4. UV exposure in excess of products' stated limits.

END OF SECTION 072500

## SECTION 07 42 13 – METAL WALL PANELS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes metal composite material wall panels.

#### 1.3 PREINSTALLATION MEETINGS

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

#### 1.4 ACTION SUBMITTALS

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

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1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
  2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Metal Material Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.

1.5 INFORMATIONAL SUBMITTALS

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

1.6 CLOSEOUT SUBMITTALS

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

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  1. Build mockup of typical metal composite material panel assembly as shown on Drawings, including corner, soffits, supports, attachments, and accessories.
  2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.
- B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.

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

1.9 FIELD CONDITIONS

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

1.10 COORDINATION

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

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including rupturing, cracking, or puncturing.
    - b. Deterioration of metals and other materials beyond normal weathering.
  - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E330:

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1. Wind Loads: As indicated on Drawings..
  2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Fire Propagation Characteristics: Metal wall panel system passes NFPA 285 testing.

## 2.2 INSULATED METAL WALL PANELS

- A. Insulated metal wall panel, basis of design: Versawall V Insulated Core Metal Wall Panel
1. Centria Architectural Systems, Moon Township, PA.
- B. Materials:
1. Metallic Coated Steel Sheet: Zinc-coated (galvanized) steel sheet ASTM A 653, Grade 37, G90, structural quality coil coated per ASTM A 755
    - a. External Face sheet: Minimum 0.030 inch / 22 gage, embossed planked. Color to be selected by Architect from manufacturer's standard colors.
    - b. Interior Face Sheet: 0.2 mil primer with 0.6 mil acrylic color coat. Color to be selected by Architect from manufacturer's standard colors.
  2. Foamed Insulation Core: Closed cell, urethane modified polyisocyanurate foam using a non-CFC blowing agent, foamed in place type.
    - a. Density: 2.6 lb/cu ft
    - b. Shear stress: 20 lb/sq in
    - c. Compressive Strength: 20 lb/sq in
    - d. Tensile Strength: 20 lb/sq in
  3. Panel Size:
    - a. Width: 30-inch
    - b. Thickness: 2-inch

## 2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. General: Provide complete metal wall panel assembly incorporating trim, copings, fasciae, parapet caps, soffits, sills, inside and outside corners, and miscellaneous flashings. Provide manufacturer's factory-formed clips, shims, flashings, gaskets, lap tapes, closure strips, and caps for a complete installation.
- B. Extrusion Trim: Provide manufacturer-provided extruded trim, including (but not limited to) base trim; coping; panel installation perimeter; and opening perimeters.
- C. Panel clips: Concealed stainless steel clip configured for metal wall panel profile by

manufacturer, engaging panel edges without compressing panel insulation.

- D. Fasteners: Self- tapping screws, bolts, nuts, and other acceptable fasteners recommended by panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal wall panels.

## 2.4 FABRICATION

- A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

## 2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.
  - 1. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

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- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal composite material panel manufacturer's written recommendations.

### 3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.
- B. Fasteners:
  - 1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.
- D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system.
- E. Rout and Return Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-turned flanges of wall panels to panel clips with manufacturer's standard fasteners.
  - 1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 079200 "Joint Sealants."
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
  - 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing agency to perform field tests and



inspections.

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

### 3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.
- B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

## **SECTION 075000 - MEMBRANE ROOFING CUTTING AND PATCHING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. General requirements for cutting and patching roofing membranes to accommodate changes or modifications to roof mounted equipment.
- B. Related Sections:
  - 1. Division 01 Section "Cutting and Patching" for other requirements related to cutting and patching.
  - 2. Division 07 Section "Modified Bituminous Membrane Roofing".
  - 3. Division 07 Section "Roof Accessories".

#### **1.2 DEFINITIONS**

- A. OEM: Original manufacturer for installed roofing systems.

#### **1.3 SYSTEM DESCRIPTION**

- A. Modified membrane patching meeting the OEM requirements for integration into existing roof system and continuance of warranty.
  - 1. 80-mil modified bitumen base sheet and 160-mil mineral surface modified bitumen cap sheet in field
  - 2. 40-mil modified bitumen base sheet and 160-mil mineral surface modified bitumen cap sheet at curb flashings
  - 3. All plies fully bonded with cold-process asphalt adhesive

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Weatherproof Integrity: Cutting and patching of membrane roofing for new curbs, installation of decking and new roofing after equipment removal, and other roof penetration flashings shall maintain the weather integrity of the existing roofs and shall not permit concealed or visible leaks into the building interior.
  - 1. Comply with the current published requirements of the OEM for roof penetrations of the type necessary for the work.

#### **1.5 SUBMITTALS**

- A. Product Data: For each type of product employed in the Work.
- B. Shop Drawings: For roofing penetrations. Provide OEM standard details and modified details where required for the conditions of the work.
- C. Manufacturer's certificates: Signed by roofing system manufacturer certifying that the roofing system complies with requirements specified. Provide evidence of acceptance by OEM manufacturer of proposed changes to existing roof system, installation procedures

for all roof membrane, and documentation that contractor is authorized by OEM to install their products.

- D. Field quality-control reports.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by OEM.
- B. Manufacturer's Representative Qualifications: OEM's authorized representative who is trained and knowledgeable in the installation of units required for this Project.
- C. Preinstallation Conference: Conduct conference at Project site.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated, weather tight location to ensure no significant moisture pickup and maintain at a temperature exceeding roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.
  - 1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.
- B. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F (10 deg C).
- C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
- D. Protect roofing insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

## 1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements. Do not install roofing products on roofs that are wet.

## 1.9 WARRANTY

- A. Where existing roof is still under OEM warranty, comply with the requirements of the OEM to maintain such warranty:

## PART 2 - PRODUCTS

### 2.1 MATERIALS AND PRODUCTS

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- A. General: Provide and employ products only as approved by OEM for the type of roofing involved. Where new products are added to existing roofs, use materials of quality level at least as high as the originally installed materials.
- B. Manufacturers: Provide materials by OEM manufacturer to match existing roof system.
  - 1. Garland Company, Inc or equal as approved by Architect.

2.2 Modified Built Up Roof System Base Sheet

- A. Base Ply of Field System: Flexbase 80: SBS modified bituminous sheet (Styrene-Butadiene- Styrene) 80 mil, smooth surfaced rubber modified roofing membrane reinforced with a dual fiberglass scrim.
  - 1. Use: Base ply of 2-ply, modified bituminous membrane roofing system.
  - 2. Reinforcing: Fiberglass.
  - 3. Finish: smooth and sanded
- B. Physical Properties: Provide SBS -modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
  - 1. Thickness: 80 mils minimum.
  - 2. Tensile Strength: 225 bf/in. at 73.4 deg F (MD). 225 lbf/in. at 73.4deg F (CMD).
  - 3. Elongation at Maximum Load: 7 percent minimum at 73.4 deg F in each direction.
  - 4. Tear Strength: 300 lbf. at 73.4 deg. F (MD). 300 lbf. at 73.4 deg. F (CMD).
  - 5. Low-Temperature Flexibility: Pass at minus 30 deg F.

2.3 Modified Built Up Roof System Flashing Base Sheet

- A. Base Ply of Flashing System: VersiPly 40: SBS modified bituminous sheet (Styrene-Butadiene- Styrene) 40 mil, smooth surfaced rubber modified roofing membrane reinforced with a dual fiberglass mat.
  - 1. Use: Base ply of 2-ply, modified bituminous membrane flashing system.
  - 2. Reinforcing: Fiberglass.
  - 3. Finish: smooth
- B. Physical Properties: Provide SBS -modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
  - 1. Thickness: 40 mils minimum.
  - 2. Tensile Strength: 215 bf/in. at 73.4 deg F (MD). 215 lbf/in. at 73.4deg F (CMD).
  - 3. Elongation at Maximum Load: 4.5 percent minimum at 73.4 deg F in each direction.
  - 4. Tear Strength: 275 lbf. at 73.4 deg. F (MD). 275 lbf. at 73.4 deg. F (CMD).
  - 5. Low-Temperature Flexibility: Pass at minus 30 deg F.

2.4 Modified Built Up Roof System Cap Sheet

- A. SBS/SIS modified bituminous sheet: StressPly E: 160 mil mineral surfaced rubber modified roofing membrane reinforced with a dual fiberglass and polyester scrim mat.
  - 1. Use: Roof membrane.
  - 2. Use: Finish ply of 2-ply, modified bituminous membrane roofing system.
  - 3. Reinforcing: Polyester and fiberglass.
  - 4. Finish: light grey mineral

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- B. Physical Properties: Provide SBS/SIS-modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
1. Thickness: 160 mils minimum.
  2. Tensile Strength: 500 lbf/in. at 73.4 deg F (MD). 550 lbf/in. at 73.4deg F (CMD).
  3. Elongation at Maximum Load: 6.0 percent minimum at 73.4 deg F in each direction.
  4. Tear Strength: 900 lbf. at 73.4 deg. F (MD). 950 lbf. at 73.4 deg. F (CMD).
  5. Low-Temperature Flexibility: Pass at minus 40 deg F.

2.5 Modified Built Up Roof System Cap Sheet (Memorial School Millennium membrane cap sheet)

- A. SBS modified coal tar bituminous sheet (Styrene-Butadiene- Styrene) 160 mil, mineral surfaced rubber modified roofing membrane reinforced with a dual fiberglass and polyester scrim mat.
1. Use: Roof membrane.
  2. Use: Finish ply of 2-ply, modified bituminous membrane roofing system.
  3. Reinforcing: Polyester and fiberglass.
  4. Finish: light grey mineral
- B. Physical Properties: Provide SBS/SIS-modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
1. Thickness: 160 mils minimum.
  2. Tensile Strength: 310 lbf/in. at 73.4 deg F (MD). 310 lbf/in. at 73.4deg F (CMD).
  3. Elongation at Maximum Load: 3,5 percent minimum at 73.4 deg F in each direction.
  4. Tear Strength: 500 lbf. at 73.4 deg. F (MD). 480 lbf. at 73.4 deg. F (CMD).
  5. Low-Temperature Flexibility: Pass at minus 58 deg F.

2.6 Modified Adhesives and Mastics

- A. Cold Applied Membrane Adhesive and Flood Coat Adhesive: V.O.C. compliant ASTM D3019. Performance Requirements:
1. Non-Volatile Content ASTM D4479 70%
  2. Density ASTM D1475 7.89 lbs./gal. (0.9kg/l)
  3. Viscosity Stormer ASTM D562 16-20 sec.
  4. Flash Point ASTM D93 100°F min. (37°C)
  5. Slope: up to 3:12
- B. Brush Grade Flashing Adhesive Weather-King Flashing Adhesive
1. Performance Requirements:
  2. Non-Volatile Content ASTM D4479 70% min.
  3. Density ASTM D1475 8.6 lbs./gal. (1kg/l)
  4. Flash Point ASTM D93 100°F (37°C)
- C. Silver Asphalt Roofing Mastic: V.O.C. compliant,

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1. Flash Point ASTM D93 >100 °F.
2. Density @ 77°F 8.3 lbs. /gal
3. Non-Volatile 70% min.
4. Viscosity @ 77 °F mobilometer 1500g 9-11 seconds
5. Reflectivity: 60%
6. Post Industrial Recycled Content 5.19%

D. Flashing Bond Mastic: V.O.C. compliant

1. Non-Volatile Content ASTM D4479 70%
2. Density ASTM D1475 7.89 lbs./gal. (0.9kg/l)
3. Viscosity Stormer ASTM D562 16-20 sec.
4. Flash Point ASTM D93 100°F min. (37°C)
5. Slope: up to 3:12

2.7 AUXILIARY MEMBRANE MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with SBS-modified bituminous roofing.
1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- B. Asphalt Primer: Garla-Prime VOC: ASTM D 41 - VOC compliant.
- C. Asphalt Roofing Cement: Flashing Bond: ASTM D 2822, asbestos free, VOC compliant as provided by the Membrane manufacturer and silver in color throughout the thickness
- D. Mastic Sealant: Polyisobutylene, plain or modified bituminous, nonhardening, nonmigrating, nonskinning, and nondrying.
- E. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions of FM 4470; designed for fastening base sheets, base-ply felts, and base flashings and for backnailing modified bituminous membrane to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
- F. Wood Nailer Strips: Furnish wood nailer strips complying with requirements of Division 6 Section "Rough Carpentry."
- G. Cants: Wood Fiber Cants
- H. Urethane Sealant: Tuff-Stuff MS: One part, non-sag sealant as recommended and furnished by the membrane manufacturer for moving joints.
1. Tensile Strength (ASTM D412) 225 psi
  2. Elongation (ASTM D412) 450%
  3. Hardness, Shore A (ASTM C920) 25-35
  4. Bond Durability – Class 25 (ASTM C920) Passes
- I. Liquid Flashing: Tuff-Flash Plus LO: A two-component, asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings. Must be painted when cured.
1. Tensile Strength (ASTM D412) 650 psi
  2. Elongation (ASTM D412) 325%

- 3. Density @77°F 8.3 lb/gal typical
- J. Energy Star Acrylic Surfacing: Pyramic Plus LO; For use on all liquid flashing details. Energy Star approved white acrylic roof coating ASTM G26 with 81% reflectivity, 250% Minimum elongation and 250 psi tensile strength.
  - 1. Weight/Gallon 12 lbs./gal. (1.44 g/cm3)
  - 2. Non-Volatile % (ASTM D 1644) 66 min
- K. Pitch Pocket Sealer: Use Liquid Flashing in lieu of pitch pockets wherever practical. Where pitch pockets are needed, use specified Liquid Flashing product to fill pitch pockets.
- L. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design
- M. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled
- N. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- O. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine roofing membranes and affected flashings before installation. Inform Owner of existing conditions that could cause leaks that may be misconstrued as the result of the new work.

#### 3.2 PREPARATION

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

#### 3.3 ROOFING MEMBRANE CUTTING AND PATCHING

- A. General: Provide the highest quality roof patches that comply with the OEM requirements. Provide redundancy in weather proof membrane where possible.
- B. Coordinate all work with work of other trades.
- C. Lap new material onto old roofing material 12" minimum. Seal all junctions of new membrane to old membrane with 3-course mastic and mesh, except in areas to be coated with reinforced urethane system.
- D. Provide positive drainage so that no detail or part of roof is required to resist ponded water.

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- E. Provide overlaps at counter flashings of minimum dimension to resist wind-blown rain.
- F. Do not use pitch pockets without secondary sheet metal hood.

3.4 PROCEDURES FOR ADDITIONS/ALTERATIONS TO EXISTING MINERAL SURFACED ROOFS

A. Preparation For New Curbs

- 1. Identify the location of each new curb to be installed, coordinating with mechanical contractor.
- 2. Clean the roof surface within area of new curb, removing all debris, loose mineral, or dirt.
- 3. Cut out and remove the roof system and all insulation layers down to the structural deck. Use a stiff bristled broom and blower to clear away all dirt and debris from the work area.

B. Flashing New Curbs

- 1. New curb shall be set with minimum flashing height of 8" or greater above finished roof surface. Install wood blocking if needed to increase height of curb.
- 2. Install cant strip to the base of the curb set in Flashing Bond adhesive.
- 3. Prime the existing roof surface around the curb with Garla-Prime VOC to ensure proper adhesion. Apply at ½ gallon per 100 sq. ft. and allow to dry.
- 4. Install the Versiply 40 base sheet flashing ply, followed by the Stressply E cap sheet to the curb in a solid application of specified flashing adhesive.
  - a. Flashing Bond
- 5. Both flashing plies should extend up and over the curb. Fasten flashing plies to the top of the curb with cap nails. The base ply should extend onto the field a minimum of 6", with the cap ply extending 3" beyond the base ply.
- 6. Apply three course reinforcement of Gar-Mesh and Flashing bond on vertical seams.
- 7. Allow new flashing membrane installation with Weatherking to cure 7 days minimum.
- 8. Paint exposed black flashings with one coat of Pyramic at a rate of .5 gal per 100 sq ft.
- 9. Install new equipment and securely fasten to the curb.

C. Flashing New Metal Curbs, Pitch Pockets, Lead Sleeves, and Equipment Stands (Stress-Ply Roof membranes)

- 1. Prime surface of existing roof with Garla-Prime or approved equal.
- 2. Set the flange of the flashing or the lead pan into an application of Flashing Bond asphalt mastic. Nail the flange 3" O.C. into the wood blocking.
- 3. Flash the flange with base and cap modified membrane stripping set in specified adhesive. Install the base ply to extend beyond the flange a minimum of 6". The second ply should extend beyond the first a minimum of 3".
  - 1) For cold adhesives, apply 2-3 gal/100 sq. ft.
- 4. Match surfaces:
  - a. Paint surface of curb with appropriate roof coating to match existing, if necessary.
  - b. On white mineral surfaced roofs, ensure loose minerals are broadcast into the bleed out of flashing adhesive.



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5. All pitch pockets shall be filled with pourable sealer.
6. A hood or storm collar will be fabricated to cover all pitch pockets and sleeves as shown in the detail drawing.
7. The hood may be attached to the projection with a draw band or by welding.
8. Prime surface of existing roof with Garla-Prime or approved equal.
9. Set the flange of the flashing or the lead pan into an application of Flashing Bond asphalt mastic. Nail the flange 3" O.C. into the wood blocking.
10. Flash the flange with base and cap modified membrane stripping set in specified adhesive. Install the base ply to extend beyond the flange a minimum of 6". The second ply should extend beyond the first a minimum of 3".
  - a. For cold adhesives, apply 2-3 gal/100 sq. ft.
11. Match surfaces:
  - a. Paint surface of curb with appropriate roof coating to match existing, if necessary.
  - b. On white mineral surfaced roofs, ensure loose minerals are broadcast into the bleed out of flashing adhesive.
12. All pitch pockets shall be filled with pourable sealer.
13. A hood or storm collar will be fabricated to cover all pitch pockets and sleeves as shown in the detail drawing.
14. The hood may be attached to the projection with a draw band or by welding.

D. Infill of Roofing after Equipment Removal

1. New decking shall be installed in all roof openings after removal of curbs.
2. Provide insulation matching up to height of existing roof assembly, including tapered boards as required to maintain roof drainage design. Properly matched tapered insulation must be provided as required to match existing tapered layout, provide for continuation of crickets, sumps, or other features of existing roof drainage design.
3. Mechanically fasten polyisocyanurate boards to metal deck using 11 fasteners per 4x8 board in Zone 1 of the roof. Increase fastening rate for work in Zone 2 (roof perimeter) to 17 fasteners per 4x8 board and in Zone 3 (corners) to 22 fasteners per board.
4. Subsequent layers of polyisocyanurate shall be adhered with Insul-Lock HR, ¾" beads applied 12" on center. Increase rate to 6" on center in Zone 2 and 4" on center in Zone 3.
5. All layers of insulation should be adhered on concrete roof decks. Follow above-referenced insulation adhesive pattern.
6. Install ½" roof cover board, adhered with Insul-Lock HR using the above-described fastening pattern. Ensure boards are set and properly bonded with edges flush and tightly fitted. Fill all gaps in insulation exceeding ¼" thick.
7. Install new roofing with all plies shingled in the direction of water. Stagger laps between base sheet and cap sheet.
8. Install new base ply (Flexbase 80) solidly bonded to the cover board with Weatherking adhesive at the rate of 2 gallons per 100 sq. ft. Broom or roll top of membrane to ensure bond with adhesive and eliminate wrinkles or trapped air.
9. Lap base sheet onto existing roof 8" minimum.
10. Install cap sheet (StressPly E Mineral) solidly bonded over the base sheet with Weatherking adhesive at the rate of 2 gallons per 100 sq. ft. Broom or roll top of membrane to ensure bond with adhesive and eliminate wrinkles or trapped air. Lap cap sheet onto existing roof 4" minimum beyond edge of base sheet.
11. Flood coat area with Weatherking and broadcast gravel into flood coat.

- E. Liquid Flashing Application
1. Provide manufacturer's liquid flashing (Tuff-Flash Plus LO, reinforced with Polyester Soft) at all roof penetration details such as pipe penetrations, conduit feeds, dunnage posts, etc.
  2. Fill all gaps around projections with insulation and new roofing membrane before flashing work.
  3. Mask target area on roof membrane with tape.
  4. Clean all non-porous areas with isopropyl alcohol. Remove asphalt or adhesive residue from projections. Prepare existing urethane coated roofing with acetone solvent wipe.
  5. Apply 32 wet mils base coat of liquid flashing over masked area and encasing projection, minimum 4" high above finished roof.
  6. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
  7. Apply 48-64 wet mil top coat of the liquid flashing material over the fabric extending 2" past the scrim in all directions.
  8. Apply minerals immediately or allow the liquid flashing material to cure 15-30 days and then install reflective coating (Pyramic Plus LO)

### 3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Representative: Review installed work and determine if work meets the highest OEM standards. Provide written confirmation of work completed and compliance with OEM requirements, including warranty provisions, where applicable.
- B. Contractor: Notify manufacturer's representative of work before starting to coordinate for inspections by the representative during the installation. Schedule a final inspection once all work is complete. A copy of the final inspection will be provided to the Architect and the Owner.

### 3.6 PROTECTING AND CLEANING

- A. Protect modified bituminous membrane roofing from damage and wear during construction period. Adjacent roof areas must be fully protected from construction activities and traffic using means and methods approved by manufacturer holding the existing warranty. Provide minimum 2" extruded polystyrene insulation and ½" plywood protection laid down over any existing roofs to remain that will be used for transport of materials or personnel access to construction areas. Limit storage of materials to in-contract roof areas. Engage warranty holder for a post-construction inspection any roofs that may have been affected by construction traffic.
- B. Correct deficiencies in or remove modified bituminous roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 50 00

**SECTION 076200 - 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 through-wall flashing.
  - 2. Manufactured reglets.
  - 3. Formed low-slope roof flashing and trim.
  - 4. Formed wall flashing and trim.
  - 5. Sheet metal requirements for brake metal

**1.3 COORDINATION**

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

**1.4 PREINSTALLATION MEETINGS**

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

**1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
  - 1. Identify 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 fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim indicated with factory-applied color finishes.

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- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
  - 1. Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments.
  - 2. Trim: 12 inches long. Include fasteners and other exposed accessories.
  - 3. Accessories: Full-size Sample.
- E. Qualification Data: For fabricator.
- F. Product Certificates: For each type of coping and roof edge flashing that is SPRIES-1 tested and FM Approvals approved.
- G. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- H. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

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

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
    - b. Chalking in excess of a No.8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Fabricate and install copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet1-49:
  - 1. Wind Zone1: For velocity pressures of 10 to 20 lbf/sq. ft. perimeter uplift force, 60- lbf/sq. ft. corner uplift force, and 20-lbf/sq. ft. outward force.
  - 2. Wind Zone1: For velocity pressures of 21 to 30 lbf/sq. ft. perimeter uplift force, 90- lbf/sq. ft. corner uplift force, and 30-lbf/sq. ft. outward force.
  - 3. Wind Zone2: For velocity pressures of 31 to 45 lbf/sq. ft.: 90-lbf/sq. ft. perimeter uplift force, 120-lbf/sq. ft. corner uplift force, and 45-lbf/sq. ft. outward force.
- D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg. F, ambient; 180 deg. F, material surfaces.
- E. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

### 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
  - 1. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Color: As selected by Architect from manufacturer's full range.
  - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- C. Stainless-Steel Sheet: ASTM A666, Type304, dead soft, fully annealed; with smooth, flat surface.
  - 1. Finish: 2D (dull, cold rolled).

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- D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A653/A653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A755/A755M.
1. Surface: Smooth, flat.
  2. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  3. Color: As selected by Architect from manufacturer's full range.
  4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D226, Typell (No.30), asphalt-saturated organic felt, nonperforated.
- B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D1970; stable after testing at 240 deg F.
  2. Low-Temperature Flexibility: ASTM D1970; passes after testing at minus 20 deg F.
  3. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.; CCWWIP300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
    - c. Henry Company; Blueskin PE200HT.
    - d. Metal-Fab Manufacturing, LLC; MetShield.
    - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- C. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal 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. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
  2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
  4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

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- C. Solder:
  - 1. For Stainless Steel: ASTM B32, GradeSn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  - 2. For Zinc-Coated (Galvanized) Steel: ASTM B32, GradeSn50, 50 percent tin and 50 percent lead or GradeSn60, 60 percent tin and 40 percent lead.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; 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 aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D1187.
- I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond. Manufacture through-wall flashing with snaplock receiver on exterior face to receive counterflashing.
  - 1. Stainless Steel: 0.016 inch thick.
    - a. Products:
      - 1) Cheney Flashing Company, Inc.; Cheney Flashing (Dovetail).
      - 2) Cheney Flashing Company, Inc.; Cheney Flashing (Sawtooth).
      - 3) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.
      - 4) Metal-Fab Manufacturing, LLC.
- B. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.
  - 1. Manufacturers:
    - a. Cheney Flashing Company, Inc.
    - b. Fry Reglet Corporation.
    - c. Heckmann Building Products Inc.
    - d. Hickman, W. P. Company.
    - e. Keystone Flashing Company, Inc.
    - f. Sandell Manufacturing Company, Inc.
  - 2. Material: Aluminum, 0.024 inch 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,

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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. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
  - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
7. Finish: Mill.

## 2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
  1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  2. Obtain field measurements for accurate fit before shop fabrication.
  3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
  1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet1-49 for application, but not less than thickness of metal being secured.
- F. Seams to be Soldered: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.

## 2.7 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not



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exceeding 12 foot long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch- high end dams. Fabricate from the following material:

1. Stainless Steel: 0.0156 inch thick.

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

1. Aluminum: 0.0320 inch thick.

## 2.8 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: 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.

## 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 Work.
1. Verify compliance with requirements for installation tolerances of substrates.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
- C. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

### 3.3 INSTALLATION, GENERAL

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- 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, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  5. Torch cutting of sheet metal flashing and trim is not permitted.
  6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
  2. Aluminum: Use aluminum or stainless-steel fasteners.
  3. Stainless Steel: Use stainless-steel fasteners.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints with elastomeric sealant as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70degF, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40degF.
  2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tem edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show

in finished Work.

1. Do not use torches for soldering.
2. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

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

### 3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof 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.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet1-49 for FM Approvals' listing for required windstorm classification.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet1-49 for specified FM Approvals' listing for required windstorm classification.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl 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 cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of manufactured or formed through-wall flashing.
- C. Openings Flashing in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

### 3.6 ERECTION TOLERANCES

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

specified in MCA's "Guide Specification for Residential Metal Roofing."

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. 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 71 00 – ROOF SPECIALTIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Copings.
  - 2. Roof-edge drainage systems.
  - 3. Reglets and counterflashings.
  - 4. Preformed flashing sleeves
- B. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
  - 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  - 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof specialties.
  - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
  - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
  - 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
  - 4. Detail termination points and assemblies, including fixed points.
  - 5. Include details of special conditions.
- C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

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D. Samples for Verification:

1. Include copings, roof-edge specialties, roof-edge drainage systems and reglets and counterflashings made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are SPRI ES-1 tested to specified design pressure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing."
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
  1. Build mockup of typical roof edge as shown on Drawings.
  2. Build mockup of typical roof edge, including fascia, gutter and downspout, approximately 10 feet long, including supporting construction, seams, attachments, underlayment, and accessories.
  3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

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1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing."
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. SPRI Wind Design Standard: Manufacture and install copings and roof-edge specialties tested according to SPRI ES-1 and capable of resisting the following design pressures:
  - 1. Design Pressure: As indicated on Drawings.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide manufacturers and products as indicated within the Exterior Materials Legend on the drawings.
  - 2. Extruded-Aluminum Coping Caps: Extruded aluminum, thickness as required to meet performance requirements.
    - a. Finish: Two-coat fluoropolymer.
    - b. Color: As indicated within the Exterior Materials Legend.
  - 3. Corners: Factory mitered and mechanically clinched and sealed watertight.
  - 4. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.
    - a. Snap-on Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.

## 2.3 ROOF-EDGE DRAINAGE SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide manufacturers and products as indicated within the Exterior Materials Legend on the drawings.
- B. Gutters: Manufactured in uniform section lengths not exceeding 12 feet, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
  - 1. Aluminum Sheet: 0.032 inch thick.
  - 2. Gutter Profile: Style refer to drawing detail, according to SMACNA's "Architectural Sheet Metal Manual."
  - 3. Embossed Surface: Embossed with design as selected by Architect from manufacturer's full range.
  - 4. Corners: Factory mitered and mechanically clinched and sealed watertight.
  - 5. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.
- C. Downspouts: Style refer to drawing detail, complete with machine-crimped elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
  - 1. Formed Aluminum: 0.032 inch thick.
- D. Aluminum Finish: Two-coat fluoropolymer.
  - 1. Color: As indicated within the Exterior Materials Legend.



2.4 REGLETS AND COUNTERFLASHINGS

- 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. Berridge Manufacturing Company.
  - 2. Castle Metal Products.
  - 3. Cheney Flashing Company.
  - 4. Drexel Metals.
  - 5. Fry Reglet Corporation.
  - 6. Heckmann Building Products, Inc.
  - 7. OMGEdeSystems (formerly, W.P. Hickman).
  - 8. Keystone Flashing Company, Inc.
  - 9. Metal-Era, Inc.
- B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
  - 1. Formed Aluminum: 0.050 inch thick.
  - 2. Stainless Steel: 0.025 inch thick.
  - 3. Corners: Factory mitered and mechanically clinched and sealed watertight.
  - 4. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
  - 5. Concrete Type, Embedded: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
  - 6. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
- C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches and in lengths not exceeding 12 feet designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:
  - 1. Stainless Steel: 0.025 inch thick.
- D. Accessories:
  - 1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
  - 2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.
- E. Aluminum Finish: Two-coat fluoropolymer.
  - 1. Color: As selected by Architect from manufacturer's full range.
- F. Stainless-Steel Finish: No. 2B (bright, cold rolled, unpolished).

2.5 MATERIALS

- A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
- C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.6 PREFORMED FLASHING SLEEVES

- A. Vent Exhaust Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted or perforated metal collar as indicated on the drawings.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Custom Solution Roof and Metal Products.
    - b. Menzies Metal Products.
    - c. Thaler Metal Industries Ltd.
  - 2. Metal: Aluminum sheet, 0.063 inch thick.
  - 3. Diameter: To fit existing vents and pipes
  - 4. Finish: Manufacturer's standard.
- B. Vent Stack and Pipe Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Custom Solution Roof and Metal Products.
    - b. Menzies Metal Products.
    - c. Milcor; Commercial Products Group of Hart & Cooley, Inc.
    - d. Thaler Metal Industries Ltd.
  - 2. Metal: Aluminum sheet, 0.063 inch thick.
  - 3. Height and Diameter: As indicated on Drawings.
  - 4. Finish: Manufacturer's standard.
- C. Aluminum Roof Cap, Fully Welded Aluminum:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Custom Solution Roof and Metal Products.
    - b. Menzies Metal Products.
    - c. Milcor; Commercial Products Group of Hart & Cooley, Inc.
    - d. Thaler Metal Industries Ltd.

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2. Metal: Aluminum sheet, 0.063 inch thick.
3. Height and Diameter: As indicated on Drawings.
4. Finish: Exterior Finish: Two-coat fluoropolymer.

2.7 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653, G90 coating designation.
  1. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.
  2. 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.
- B. Galvanized-Steel Tube: ASTM A500, round tube, hot-dip galvanized according to ASTM A123.
- C. Steel Pipe: ASTM A53, galvanized.
- D. Aluminum Extrusions and Tubes: ASTM B 221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.

2.8 MISCELLANEOUS MATERIALS

- A. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
  1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153 or ASTM F2329.
  2. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
  3. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- B. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- E. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- F. Underlayment:
  1. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
  2. Slip Sheet: Building paper, 3 lb/100 sq. ft. minimum, rosin sized.

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- 3. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
- G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- H. Cellulosic-Fiber Board Insulation: ASTM C208, Type II, Grade 1, thickness as indicated.
- I. Glass-Fiber Board Insulation: ASTM C726, nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F, thickness as indicated.
- J. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPAC2; not less than 1-1/2 inches thick.

2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Aluminum Sheet Finishes:
  - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- E. Aluminum Extrusion Finishes:
  - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

### 3.3 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  - 4. Torch cutting of roof specialties is not permitted.
  - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
  - 1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
  - 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

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- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.4 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
  - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

3.5 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 12 inches apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
  - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion-joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
  - 1. Provide elbows at base of downspouts at grade to direct water away from building.
  - 2. Connect downspouts to underground drainage system indicated.

3.6 REGLET AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.
- B. Embedded Reglets: See Section 033000 "Cast-in-Place Concrete" and Section 042200 "Concrete Unit Masonry" for installation of reglets.
- C. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

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- D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with butyl sealant. Fit counterflashings tightly to base flashings.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

## 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. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
  - 1. New and newly created exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
    - a. Control and expansion joints in unit masonry and natural stone.
    - b. Joints in metal trim.
    - c. Joints between different materials listed above.
    - d. Perimeter joints between materials listed above and frames of doors, translucent panels and windows.
    - e. Other joints as indicated.
  - 2. New and newly created interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry walls.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors windows and ceilings.
    - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - f. Joints between different materials listed above
    - g. Other joints as indicated.
  - 3. New and newly created interior joints in the following horizontal traffic surfaces:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Other joints as indicated.
- B. Related Sections include the following:
  - 1. Division 07 Section "EPDM Roofing" and "Standing Seam Metal Roofing" for sealing joints in these constructions.
  - 2. Division 08 Section "Glazing" for glazing sealants.
  - 3. Division 09 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

#### 1.4 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 type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer and testing agency.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. 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.
- I. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used.
  - 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- J. Field Test Report Log: For each elastomeric sealant application.
- K. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- L. Warranties: Special warranties specified in this Section.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. 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. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
  - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
  5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the commencement of the Work.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
  2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
  3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

#### 1.6 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 or are below 40 deg F.
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

#### 1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric 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 elastomeric sealant manufacturer agrees to furnish elastomeric 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: 5 years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
  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 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

### 2.2 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 sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: Match Architect's samples for polyurethane sealants. For all other types of sealants, colors shall be as selected by Architect from manufacturer's full range.

### 2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- C. Single-Component Neutral- Silicone Sealant ES-1:
  - 1. Available Products:
    - a. Dow Corning Corporation; 791.
    - b. GE Silicones; SilPruf NB SCS9000.
    - c. Pecora Corporation; 895.
  - 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.
    - a. Use O Joint Substrates: Aluminum coated with a high-performance coating, concrete block.
  - 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- D. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant ES-2:
  - 1. Available Products:
    - a. Dow Corning Corporation; 786 Mildew Resistant.
    - b. GE Silicones; Sanitary SCS1700.
    - c. Tremco; Tremsil 200 Sanitary, White.
  - 2. Type and Grade: S (single component) and NS (nonsag).
  - 3. Class: 25.
  - 4. Use Related to Exposure: NT (nontraffic).
  - 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
    - a. Use O Joint Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, ceramic tile and concrete masonry.
- E. Multicomponent Nonsag Urethane Sealant ES-3:
  - 1. Available Products:

- a. Pecora Corporation; Dynatrol II.
    - b. Tremco; Dymeric 240.
  2. Type and Grade: M (multicomponent) 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.
    - a. Use O Joint Substrates: Color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, ceramic tile and porcelain, wood and concrete masonry.
  6. Provide color packs to custom color match sealant color to Architect's sample.
- F. Single Component Pourable Urethane Sealant ES-4:
  1. Available Products:
    - a. Bostik Findley; Chem-Calk 950.
    - b. Pecora Corporation; Urexpan NR-201.
    - c. Polymeric Systems Inc.; Flexiprene 952.
    - d. Sika Corporation; Sikaflex - 1CSL.
    - e. Tremco; Vulkem 45.
  2. Type and Grade: S (single component) and P (pourable).
  3. Class: 25.
  4. Use Related to Exposure: T (traffic).
  5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
    - a. Use O Joint Substrates: Concrete and concrete masonry.

## 2.4 LATEX JOINT SEALANTS

- A. Latex Sealant LS-1: Comply with ASTM C 834, Type P, Grade NF.
- B. Available Products:
  1. Bostik Findley; Chem-Calk 600.
  2. Pecora Corporation; AC-20+.
  3. Schnee-Morehead, Inc.; SM 8200.
  4. Sonneborn, Division of ChemRex Inc.; Sonolac.
  5. Tremco; Tremflex 834.

## 2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type 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), 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 where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## 2.6 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, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
    - d. Concrete Masonry.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous 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.
    - e. Glazed surfaces of toilet and lavatory fixtures.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on 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 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. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type 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.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. 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.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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 configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
  - 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
  - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

### 3.4 CLEANING

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

3.5 PROTECTION

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

3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application JS-1: Exterior vertical control and expansion joints in unit masonry and cast stone.
  - 1. Joint Sealant: Single-component nonsag urethane sealant ES-3.
  - 2. Joint-Sealant Color: Match mortar color.
- B. Joint-Sealant Application JS-2: Exterior joints metal fascia, flashing and trim.
  - 1. Joint Sealant: Single-component neutral-curing silicone sealant ES-1.
  - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- C. Joint-Sealant Application JS-3: Exterior perimeter joints between masonry (including cast stone) and frames of doors, windows, louvers, and wall panels.
  - 1. Joint Sealant: Multicomponent nonsag urethane sealant ES-3.
  - 2. Joint-Sealant Color Match Architect's Sample.
- D. Joint-Sealant Application JS-4: Vertical control and expansion joints on exposed interior surfaces of exterior walls.
  - 1. Joint Sealant: Multicomponent nonsag urethane sealant ES-3.
  - 2. Joint-Sealant Color: Match Architect's Sample.
- E. Joint-Sealant Application JS-5: Interior perimeter joints of exterior openings.
  - 1. Joint Sealant: Latex sealant.
  - 2. Joint-Sealant Color: Match Architect's Sample.
- F. Joint-Sealant Application JS-6: Interior joints between adjoining plumbing fixtures, walls, floors, sills, and counters.
  - 1. Joint Sealant: Single-component mildew-resistant acid-curing silicone sealant ES-2.
  - 2. Joint-Sealant Color: White.
- G. Joint-Sealant Application JS-7: Vertical joints on exposed surfaces of interior masonry walls and partitions.
  - 1. Joint Sealant: Latex sealant.
  - 2. Joint-Sealant Color: Match Architect's Sample.
- H. Joint-Sealant Application JS-8: Perimeter joints between interior wall surfaces and frames of interior doors, and perimeter of ceiling systems intersection with wall.
  - 1. Joint Sealant: Latex sealant.
  - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- I. Joint-Sealant Application JS-9: Interior control, expansion, and isolation joints in horizontal traffic surfaces of concrete flooring.
  - 1. Joint Sealant: Single component, pourable urethane sealant ES-4.
  - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

**END OF SECTION 07 92 00**

SECTION 08 45 23 – FIBERGLASS-SANDWICH PANEL ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
  - 1. Refer to Specification 01 50 00 Temporary Facilities and Controls

1.2 SUMMARY

- A. Section includes aluminum-framed assemblies incorporating fiberglass-sandwich panels as follows:
  - 1. Skylight assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.
- B. Shop Drawings: For panel assemblies. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.
  - 2. Preconstruction Testing Shop Drawings: Prepared by a qualified preconstruction testing agency, showing details of laboratory mockup.
    - a. Resubmit Shop Drawings with changes made to details of laboratory mockup to successfully complete preconstruction testing.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
  - 1. Fiberglass-sandwich panels.
- D. Delegated-Design Submittal: For panel assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for panel assemblies.
- B. Warranties: Sample of special warranties.



1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For panel assemblies to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: For fiberglass-sandwich panels, a qualified manufacturer whose facilities, processes, and products are monitored by an independent, accredited quality-control agency for compliance with applicable requirements in ICC-ES AC04, "Sandwich Panels," or ICC-ES AC177, "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems."
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of panel assemblies required for this Project.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for panel 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. Performance characteristics are indicated by criteria subject to verification by one or more methods including testing conducted by an independent testing agency and in-service performance.
  - 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.
- D. Preinstallation Conference: Conduct conference at Project site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of panel assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - c. Water leakage.
  - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Fiberglass-Sandwich-Panel Warranty: Manufacturer's standard form in which manufacturer agrees to replace panels that exhibit defects in materials or workmanship.
  - 1. Defects include, but are not limited to, the following:
    - a. Fiberbloom.
    - b. Delamination of coating, if any, from exterior face sheet.
    - c. Color change exceeding requirements.
    - d. Delamination of panel face sheets from panel cores.

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

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Fiberglass-sandwich-panel assemblies shall withstand the effects of the following forces without failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Structural loads.
  2. Thermal movements.
  3. Movements of supporting structure.
  4. Dimensional tolerances of building frame and other adjacent construction.
  5. Failure includes, but is not limited to, the following:
    - a. Deflection exceeding specified limits.
    - b. Water leakage.
    - c. Thermal stresses transferred to building structure.
    - d. Noise or vibration created by wind, thermal, or structural movements.
    - e. Loosening or weakening of fasteners, attachments, and other components.
- B. Structural Loads:
1. Seismic Loads: As indicated on Drawings.
  2. Wind Loads: As indicated on Drawings.
    - a. Basic Wind Speed: 90 mph.
    - b. Importance Factor: 1.5.
    - c. Exposure Category: C.
- C. Deflection Limits:
1. Vertical Panel Assemblies: Limited to 1/180 of clear span for each assembly component.
  2. Overhead Panel Assemblies: Limited to 1/180 of clear span for each assembly component.
- D. Structural-Test Performance: Provide panel assemblies tested according to ASTM E 330, as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

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- F. Water Penetration under Dynamic Pressure: Provide panel assemblies that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
  - 1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water that is controlled by flashing and gutters and drained to the exterior, or water that cannot damage adjacent materials or finishes.
- G. Roof-Covering Classification: Class B per ASTM E 108 or UL 790.
- H. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- I. Energy Performance: Provide panel assemblies with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled according to NFRC:
  - 1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.65 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  - 2. Solar-Heat-Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.6 as determined according to NFRC 200.
  - 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft.

## 2.2 MANUFACTURERS

- A. Basis-of-Design: Subject to compliance with requirements, provide Kalwall Corporation or a comparable product by one of the following:
  - 1. Major Industries, Inc.
  - 2. Skywall Translucent Systems; Vistawall Group (The).
  - 3. Structures Unlimited, Inc.
  - 4. Quadwall® UniQuad® Insulated Translucent Panels.

## 2.3 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

- A. Aluminum clampite installation system - Skyroof:
  - 1. Clamp-tite screw type closure system shall be of extruded aluminum alloy and temper as recommended by manufacturer.
  - 2. Curved aluminum clampite installation system may be roll formed.
- B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clampite installation system at the factory under controlled conditions.

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- C. Fasteners: 300 series stainless steel screws for aluminum clampite installation system, excluding final fasteners to the building.
- D. Finish:
  - 1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's full range of standards. See warranty required.

2.4 FIBERGLASS-SANDWICH PANEL COMPONENTS

A. Face Sheets:

- 1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
  - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
  - b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
- 2. Interior face sheets:
  - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 450 when tested in accordance with UL 723.
  - b. Burn extent by ASTM D 635 shall be no greater than 1".
  - c. Class CCI
- 3. Exterior face sheets:
  - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
  - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand-held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
  - c. Erosion Protection: Integral, embedded-glass erosion barrier and warranted against reinforcing fiber bloom for twenty years from date of delivery.
- 4. Appearance:
  - a. Exterior face sheet: Smooth, .070" thick and CRYSTAL in color.
  - b. Interior face sheet: Smooth, .045" thick and WHITE in color.
  - c. Face sheets shall not vary more than  $\pm 10\%$  in thickness and be uniform in color.

B. Grid Core:

- 1. Aluminum I-beam grid core shall be of alloy and temper recommended by manufacturer with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".

C. Laminate Adhesive:

- 1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
- 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.

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3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
  - a. 50% Relative Humidity at 68° F: 540 PSI
  - b. 182° F: 100 PSI
  - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
  - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.5 FIBERGLASS-SANDWICH PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
  1. Thickness: 2-3/4 inches
  2. Grid Core Insulation: Fill panel cores with fiberglass batt.
  3. Panel U-factor by NFRC certified laboratory: 2-3/4" aluminum grid 0.29 "U"
  4. Complete insulated panel system shall have NFRC certified U-factor of 0.38.
  5. Visible Light Transmittance (VLT):
    - a. Visible LT (NFRC 202) by NFRC certified laboratory: 26%.
  6. Solar heat gain coefficient 0.26.
  7. Grid pattern as viewed: Nominal size 12" x 24" Shoji grid pattern.
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10'-0" span without a supporting frame by ASTM E 72.
- C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure:
  1. Absence of flame penetration through the wall assembly at any time.
  2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.
  3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.
- D. Skyroof:
  1. Skyroof system shall pass Class A Roof Burning Brand Test by UL 790.
- E. Skyroof System shall meet the fall through requirements of OSHA 1910.21 as demonstrated by testing in accordance with ASTM E 661, thereby not requiring supplemental screens or railings.

2.6 FABRICATION

- A. Frame System Fabrication:
  1. Fabricate components before finishing.
  2. Fabricate components that, when assembled, have the following characteristics:
    - a. Profiles that are sharp, straight, and free of defects or deformations.
    - b. Accurately fitted joints with ends coped or mitered.
    - c. Internal guttering systems or other means to drain water passing through joints, condensation occurring within components, and moisture migrating within assembly to exterior.

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3. Fabricate sill closures with weep holes and for installation as continuous component.
4. Reinforce components as required to receive fastener threads.

B. Panel Fabrication: Factory assemble and seal panels.

1. Laminate face sheets to grid core under a controlled process using heat and pressure to produce straight adhesive bonding lines that cover width of core members and that have sharp edges.
  - a. White spots indicating lack of bond at intersections of grid-core members are limited in number to four for every 40 sq. ft. of panel and limited in diameter to 3/64 inch.
2. Fabricate with grid pattern that is symmetrical about centerlines of each panel.
3. Fabricate panel to allow condensation within panel to escape.
4. Reinforce panel corners.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

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 between aluminum components to produce hairline joints free of burrs and distortion.
  4. Rigidly secure nonmovement joints.
  5. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
  6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with corrosion-resistant coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install continuous aluminum sill closures with weatherproof expansion joints and locked and sealed corners. Locate weep holes at rafters.

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- D. Install components to drain water passing through joints, condensation occurring within aluminum members and panels, and moisture migrating within assembly to exterior.
- E. Install components plumb and true in alignment with established lines and elevations.
- F. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:
  - 1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
  - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet, but no greater than 1/2 inch over total length.

END OF SECTION

## **SECTION 085113 - ALUMINUM WINDOWS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. Section includes aluminum windows for exterior locations.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants".
  - 2. Section 084113 "Aluminum-Framed Entrances and Storefronts" for coordinating finish among aluminum fenestration units.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference onsite.
  - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
  - 3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
  - 4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
  - 5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.
- B. Shop Drawings: For aluminum windows.
  - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.



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- C. Samples: For each exposed product and for each color specified, **2 by 4 inches** in size.
- D. Samples for Initial Selection: For units with factory-applied finishes.
  - 1. Include Samples of hardware and accessories involving color selection.
- E. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
  - 1. Exposed Finishes: **2 by 4 inches**
  - 2. Exposed Hardware: Full-size units.
- F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturer's warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 SYSTEM DESCRIPTION

- A. General: In addition to requirements shown or specified comply with applicable provisions of AAMA/WDMA/CSA 101/I.S.2/A440-08 for design, materials, fabrication and installation of component parts.
- B. Window Replacement Requirements:

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1. Work Included: Provide labor, materials and equipment necessary to complete the work of the Replacement Window Contract, and without limiting the generality thereof include:
2. Removal of existing sash, fixed glazing, frames and other accessories as required by the proposed replacement system.
3. Removal of other existing work as required for the proper installation and operation of the new units.
4. Removal from site and legal disposal of all removed materials, debris, packaging, banding and all other surplus materials and equipment.
5. Provide new factory glazed, thermally broken, aluminum windows, types as specified herein, together with necessary mullions, panning, trim, expanders, operating hardware, installation hardware and all other accessories as required.
6. Treated wood blocking, fillers and nailers as required for secure installation. Bidders shall survey conditions of existing sills and jambs prior to bidding. Contractor shall be responsible for providing new blocking for portions of same that are deteriorated.
7. Fiberglass insulation between window frames and adjacent construction.
8. Sealing of all joints within each window assembly.
9. Sealing of entire exterior perimeter of window units after installation.
10. Field observations and measurements of existing openings and conditions.

C. Design Requirements:

1. Manufacturer/subcontractor is responsible for designing system, including installation instructions and necessary modifications to meet specified requirements and maintain visual design concepts.
2. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.
3. Provide assemblies free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
4. Installation instructions are to take into account specified site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
5. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.
6. Evacuate water without infiltration to interior from exterior face of wall, water entering joints, and condensation occurring within windows, by drain holes and gutters of adequate size or other acceptable method.
7. Provide concealed fastening wherever possible.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum 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, condensation, and air infiltration.
  - c. Faulty operation of movable sash and hardware.
  - d. Deterioration of materials and finishes beyond normal weathering.
  - e. Failure of insulating glass.
2. Warranty Period:
  - a. Window: (10) Ten years from date of Substantial Completion.

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- b. Glazing Units: (10) Ten years from date of Substantial Completion.
- c. Aluminum Finish: (10) Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.
- B. Basis of Design:
  - 1. **Window Type 1: Series GT2200 Single Hung as manufactured by Graham Architectural Products, York, PA**
    - a. Other Manufacturers:
      - (1) EFCO Corporation
      - (2) Waussau Window & Wall Systems
      - (3) Kawneer
  - 2. **Window Type 2: Series GT1400 Fixed as manufactured by Graham Architectural Products, York, PA.**
    - a. Other Manufacturers:
      - (1) EFCO Corporation
      - (2) Waussau Window & Wall Systems
      - (3) Kawneer
- C. Thermal Barrier: Provides a continuous uninterrupted thermal barrier around the entire perimeter of the frame and all sash and not be bridged by any metal conductors at any point. Provide manufacturer's standard construction which has been in use on similar window units for a period of not less than three years, has been tested to demonstrate resistance to thermal conductance and condensation and has been tested to show adequate strength per AAMA 505.
- D. Glazing: (Series 1400 Fixed) - Inside glazed window with an exterior sloped putty bead glazing return.
  - 1. Putty bead profile - Not less than 45° degree slope off the vertical plane of sash and shall extend inward a minimum of 0.312".
  - 2. Snap on sloped beads are not permitted.
- E. Stating this product in no way prohibits other manufacturers from submitting alternate products of approved quality under the provisions of Division 1 Section "Substitutions." Architect will record time required for evaluating substitutions proposed by Contractor after receipt of bids, and for making changes in the Contract Documents. Whether or not Architect accepts Contractor proposed substitution, Contractor shall reimburse Owner for charges of Architect and Architect's consultants for evaluating each proposed substitution.
- F. Document each request with supporting data substantiating compliance of proposed substitution with Contract Documents, including:
  - 1. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, sight lines and other pertinent characteristics.
  - 2. Net change to Contract Sum if substitution is accepted.
  - 3. Changes required in other Work.
  - 4. AAMA Certified test data and reports to show compliance with performance characteristics specified.
  - 5. Samples of product, finishes, and glazing when applicable.
  - 6. Additional supporting information as necessary or requested.

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- G. A request for substitution constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it is equal or superior in all respects to specified product.
  2. Will provide identical warranty as required for specified product.
  3. Will coordinate installation and make changes to other Work which may be required.
  4. Waives claims for additional costs or time extension which may subsequently become apparent.
  5. Certifies that proposed product will not affect or delay Construction Progress Schedule.
  6. Will pay for changes to building design, including architectural or engineering design, detailing, and construction costs caused by the requested substitution.
- H. Pre-Bid Qualifications:
1. All bids must be based on pre-qualified products. To qualify, the bidder must furnish one complete typical project size window unit 10 days prior to the time set for bids. Accompanying the sample will be certified test reports from an accredited AAMA Laboratory verifying that the performance of the product meets or exceeds the AW-PG120 (Fixed/Fixed Off-Set); AW-PG40 (Horizontal Slider) classification.
  2. This sample must be a true and accurate representation of the window the bid is based on with the finish being the only exception. No verbal approvals will be given. Each submitter will be notified in writing of acceptance or rejection.
  3. The manufacturer must verify that it has been engaged in the manufacturing of the product in their production facility for a period of five (5) years.
  4. Maintenance manuals accompany the product sample being submitted for approval.
  5. Sight lines to match the base product specified.
  6. The qualified bidder must verify that the bidder has been involved with the installation of this type of product in a minimum of 5 projects of similar scope and quality.

## 2.2 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by window manufacturer for strength, corrosion resistance and application of required finish, but not less than 22,000 psi ultimate tensile strength, a yield of 16,000 psi. Comply with ASTM B 221.
- B. Fasteners: Aluminum, stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum window members, trim, anchors and other components of window units.
1. Do not use exposed fasteners on exterior except where unavoidable. Match finish of adjoining metal.
  2. Provide non-magnetic stainless steel, tamper-proof screws for exposed fasteners, where required, or special tamper-proof fasteners.
  3. Locate fasteners so as not to disturb the thermal barrier construction of windows.
- C. Anchors, Clips and Window Accessories: Depending on strength and corrosion-inhibiting requirements, fabricate units of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with ASTM A123.
- D. Compression Glazing Strips and Weatherstripping: At manufacturer's option, provide neoprene gaskets complying with ASTM D2000 Designation 2BC415 to 3BC415, PVC gaskets complying with ASTM D2287, or expanded neoprene gaskets complying with ASTM C509, Grade 4.
- E. Sealant:
1. Unless otherwise indicated for sealants required within fabricated window units, provide elastomeric type as recommended by window manufacturer for joint size and movement, to remain permanently elastic, non-shrinking and non-migrating. Provide product complying with AAMA Specification 803 and 808.

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2. Refer to Division 7 for perimeter sealants between window units and surrounding construction.

### 2.3 WINDOW TYPES (OPERATIONS)

- A. General: Except as otherwise indicated, provide window units complying with requirements of AAMA Classification "AW" grade windows. Windows for this project will be rated a minimum of AW-PG120 (Fixed); AW50 (Single Hung) for full size test units per AAMA/WDMA/CSA 101/I.S.2/A440-08 to withstand a design pressure of 120 (Fixed); 50 (Single Hung) psf minimum.
- B. Window Type 1: Fixed Aluminum Windows, no operating hardware or equipment is required.
- C. Window Type 2: Single-Hung Aluminum Windows
  1. Units: One balanced, vertically sliding sash requiring up to four (4) counterbalancing mechanisms complying with AAMA 902 "Sash Balance Specifications". Lift rail will have nylon end caps to protect the machined ends of the rail. Saw cut or machined edges will not be acceptable. Pull down handle on bottom of meeting rail of upper sash if upper sash is operable.
  2. Provide units which have "lift-out" feature permitting easy removal of both sash from inside without special tools.
  3. Tilt-in type sash is not acceptable for this project.
- D. Glazing: (Fixed) - Inside glazed window with an exterior beveled glazing return.
  1. Putty bead profile - Not less than 45° degree slope off the vertical plane of sash and shall extend inward a minimum of 0.312 inches.
  2. Snap on sloped beads are not permitted.

### 2.4 FABRICATIONS AND ACCESSORIES

- A. General: Provide manufacturer's standard fabrication and accessories which comply with specifications. Include complete system for assembly of components and anchorage of window units and provide complete pre-glazing at the factory.
- B. Window Material:
  1. Windows and Muntin Bars: Aluminum.
  2. Secondary Members (friction tabs, shoes, weatherstripping guides, etc.): Aluminum or a material compatible with aluminum.
  3. Main Frame: Nominal thickness of not less than 0.062".
  4. Main Frame Sill: Nominal thickness of not less than 0.078".
  5. Standard wall thickness tolerance: In accordance with the Aluminum Association.
- C. Master Frame: Not less than 3-1/4" in depth.
- D. Sash: (Single Hung) - Hollow extruded horizontal sections and not less than 1-5/8 inches in depth.
- E. Hardware: (Single-Hung)
  1. Material: Aluminum, stainless steel or other non-corrosive materials compatible with aluminum for hardware having component parts which are exposed. Cadmium or zinc-plated steel where used must be in accordance with ASTM Specification B 766 or B 633.
  2. White bronze sweep locks, use 2 when unit is over 42 inches wide.
  3. Aluminum automatic head and sill latches, one at head and two at sills over 26 inches, typical.
- F. Thermal Barrier: Provides a continuous uninterrupted thermal barrier around the entire perimeter of the frame and shall not be bridged by any metal conductors at any point.

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G. Construction:

1. Assembly: Fabricate butt joints of the main frame and sash, coped and joined neatly and secured by means of screws anchored in integral ports. Seal main frame on the outside with a narrow joint sealant meeting AAMA 803 specifications for narrow joint sealants.
2. Sash: (Single Hung) - Screwed together construction so that they may be easily repaired.
3. Meeting Rail Interlock: (Single Hung) - Two separate and distinct metal interlocks. Weatherstrip the meeting rail with fin-seal.
4. Fasten the top fixed meeting rail to the frame jamb by a minimum of two screws per jamb (Single Hung)
5. Top Fixed Glass (Single Hung): Inside glazed and of equal site lines to bottom sash.

H. Mullions - Other structural members: When mullion units occur, whether they are joined by integral mullions, independent mullions or by a combination of frame members, the resulting members must be capable of withstanding the load outlined under Uniform Load specified load requirements, without deflecting more than 1/175th of its span. When independent or integral mullions are used to join windows, the mullions shall contain a thermal barrier as specified. Evidence of compliance may be by mathematical calculations.

I. Glazing:

1. Pre-glaze all units at the factory with glazing as follows:
  - a. G-1, Insulating Glass
  - b. G-2, Insulated Glazing Panel
  - c. Obscure Glass: For "obscure" locations provide patterned glass at inboard lite.
2. Glaze units to allow for glass replacement without the use of special tools.
3. Reference Exterior Elevations for those locations per Glazing Type.

2.5 CASING COVER SYSTEM: (Panning, Trims, Receptors, Mullions, Sills, etc.)

- A. Exterior Casing Covers (Panning, Receptors, Subsills, Sills): Provide extruded prime alloy aluminum 6063-T5 no less than nominal 0.078" wall thickness. Casing covers of less than 2" in depth from the window frame may be of 0.062" wall thickness. Provide aluminum sections of one piece designed to lock around the entire window frame for a weathertight connection.
1. Secure the casing cover section at the corners with stainless steel screws in integral screw ports with the joints back sealed using a compatible sealant.
  2. Exposed screws, fasteners or pop rivets are not acceptable on the exterior of the casing cover system.
- B. Exterior mullion covers: Extruded aluminum shape to provide rigidity, no less than nominal 0.062" wall thickness. Seal against the casing cover sections with continuous bulbous vinyl weatherstrip interlocked within the mullion cover.
- C. Interior trim:
1. Interior Trim, Closures and Angles: As detailed, of extruded shapes no less than 0.062" nominal wall thickness.
  2. Snap Trim: Supply in required lengths and attach with clips using slotted or elongated holes spaced no more than 18" on center. No exposed screws will be allowed on interior trim.

2.6 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
1. Type and Location: For all operable window sashes. Reference window types.

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- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
  - 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
- C. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch- diameter, coated aluminum wire.
  - 1. Wire-Fabric Finish: Black

## 2.7 ALUMINUM WINDOW FINISHES

- A. Finish Options:
  - 1. Provide manufacturer's standard 2 coat 50% Fluoropolymer baked on, electrostatically applied enamel coating.
  - 2. Color/Finish: Standard finish to be selected from manufacturers color line by Architect / Owner.

## 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 the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- 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 to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible 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 hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
  - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION



**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:
  - 1. Glass for windows, doors, and interior borrowed lites.
  - 2. Glazing sealants and accessories.
  - 3. Infill panels at window frames

**1.3 DEFINITIONS**

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

**1.4 COORDINATION**

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

**1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of the following products; 12 inches square.
  - 1. Insulating glass.
- C. Glazing Accessory Samples: For sealants, in 12-inch lengths.

- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, glass testing agency and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Sample Warranties: For special warranties.

#### 1.7 QUALITY ASSURANCE

- A. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- B. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

#### 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

#### 1.10 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of

laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

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

- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

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

## 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. Guardian Glass; SunGuard.
  2. JE Berkowitz, LP.
  3. Oldcastle BuildingEnvelope™.
  4. Pilkington North America.
  5. Viracon, Inc.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
1. Obtain tinted glass from single source from single manufacturer.
  2. Obtain reflective-coated glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

- 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 mm thick.
  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.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: 1/4 inch thick unless otherwise indicated. Where glass thickness is indicated, it is a minimum.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.

## 2.5 INSULATING GLASS (G-1)

- A. Insulating-Glass Units (tempered): Factory-assembled units consisting of sealed lites of tempered glass, low e, separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
  2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
  3. Overall System Thickness: 1 inch.

## 2.6 INSULATED GLAZING PANEL (G-2)

A. Insulated Glazing Panel Manufacturers:

1. Basis of design: Thermolite insulated glazing panels manufactured by Laminators Inc. – [www.laminatorsinc.com](http://www.laminatorsinc.com)
2. Other insulated glazing panel manufacturer who meets the requirements of this specification upon review of the Architect

B. Insulated Glazing Panel Description

1. Construction:
  - a. A foam plastic core bonded on both sides to a thermoplastic stabilizer with a texture/color finished sheet of aluminum on each face and is manufactured in a laminated batch process using adhesive(s) between dissimilar materials.
2. Core:
  - a. Calcium Silicate: 18.0 pcf density.
  - b. Expanded Polystyrene (EPS): 2.0 pcf density (Type IX)
  - c. Polyisocyanurate (ISO): 2.0 pcf density (Type I)]
3. Stabilizers:
  - a. [Extruded Profile Polypropylene]
4. Aluminum Sheets (in accordance with ASTM B209):
  - a. Face Thickness: 0.015 inch nominal or thicker
  - b. Backer Thickness: 0.0125 inch nominal or thicker
5. Thickness / R-Value (hr °F ft<sup>2</sup> / BTU) (tested in accordance with ASTM C518):
  - a. 1 inch / R-3.3 (EPS), 1 inch / R-3.9 (ISO)

6. Thermal Movement: Allow for free and noiseless horizontal and vertical thermal movement due to expansion and contraction of insulated glazing panels over a temperature range of -20°F to +180°F at the material surface.
  - a. Buckling, opening of joints, failure of sealants, or any other detrimental effects of thermal movement are not permitted.
  - b. Installation procedures shall consider the ambient temperature range at the time of the respective operation.
7. Fire Performance: [Noncombustible Material per IBC as tested in accordance with the following:]
  - a. Elementary materials (i.e. core) tested in accordance with ASTM E136]
  - b. Composite materials (i.e. insulated glazing panel) tested in accordance with ASTM E84: Class A Material
    - i. Insulated glazing panels shall have a Flame Spread Index (FSI) of not more than 25 in the maximum thickness as intended for use.
    - ii. Insulated glazing panels shall have a Smoke Developed Index (SDI) of not more than 450 in the maximum thickness as intended for use.
8. Exterior Finish: Finish shall meet the performance criteria of AAMA 2605.
  - a. Anodized:
    - i. Clear Coating: AA-m12C23A31 Architectural Class
    - ii. Color Coating: AA-M12C23A34 Architectural Class
  - b. Selected from Manufacturer's standard color chart

## 2.7 GLAZING SEALANTS

- A. General:
  1. Compatibility: Compatible with one another and with other materials they 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. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
  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. Dow Corning Corporation.
    - b. GE Construction Sealants; Momentive Performance Materials Inc.
    - c. Tremco Incorporated.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 804.3 tape, where indicated.
  - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Clear Microlayered Safety and Security Window Film: 3M™ Scotchshield™ Ultra S600 Safety and Security Window Film including impact protection attachment system.
  - 1. Optically clear microlayered polyester film, nominally 6 mils (0.006") thick, with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is clear and does not contain dyed polyester. The adhesive is pressure-activated, not water-activated, and forms a mechanical bond, not chemical bond, to the glass. The film is microlayered with both plastic and ductile polyester layers for tear resistance.
  - 2. Refer to and include Manufacturer's methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.



- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- 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, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. 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.

### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal

without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 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.

### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

### 3.8 INSULATED GLASS SCHEDULE

- A. Glass Type G-1: Insulated Glass

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1. Overall Unit Thickness: 1 inch.
  2. Minimum Thickness of Each Glass Lite: 6 mm.
  3. Outdoor Lite: Clear fully tempered float glass with Low E coating.
  4. Interspace Content: Air.
  5. Indoor Lite: Clear fully tempered float glass
- B. Glass Type G-2: Insulated Glazing Panel
1. Overall Unit Thickness: 1 inch.

END OF SECTION 08 8000

**SECTION 09 91 00 - PAINTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes surface preparation and field painting of the following:
  - 1. Exposed exterior items and surfaces.
  - 2. Exposed interior items and surfaces.
  - 3. Repainting and surface preparation at areas of remodeling.
  - 4. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
- C. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels, unless noted otherwise.
  - 1. Prefinished items include the following factory-finished components.
    - a. Architectural woodwork and casework, unless otherwise indicated.
    - b. Acoustical wall panels.
    - c. Toilet compartments.
    - d. Metal lockers.
    - e. Elevator entrance doors and frames.
    - f. Elevator equipment.
    - g. Finished mechanical and electrical equipment, unless otherwise indicated.
    - h. Light fixtures.
    - i. Distribution cabinets, except when in corridors or other normally occupied rooms.
  - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    - a. Foundation spaces.
    - b. Furred areas.
    - c. Ceiling plenums.
    - d. Utility tunnels.
    - e. Pipe spaces.
    - f. Duct shafts.
    - g. Elevator shafts.
  - 3. Finished metal surfaces include the following:
    - a. Anodized aluminum.
    - b. Fluoropolymer, powder coated or epoxy finished metal.
    - c. Stainless steel, except exposed metal flashing indicated for field-painted finish.
    - d. Chromium plate.
    - e. Copper.
    - f. Bronze and brass.
  - 4. Operating parts include moving parts of operating equipment and the following:
    - a. Valve and damper operators.
    - b. Linkages.
    - c. Sensing devices.

- d. Motor and fan shafts.
- 5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

E. Related Sections include the following:

- 1. Division 05 Section "Pipe and Tube Railings": Shop priming metal railings.
- 2. Division 08 Section "Hollow Metal Doors and Frames": Shop priming steel doors and frames.
- 3. Division 09 Section "Gypsum Board": Surface preparation for gypsum board.

## 1.2 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

- 1. Flat: Lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
- 2. Eggshell: Low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
- 3. Satin: Low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
- 4. Semigloss: Medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
- 5. Full Gloss: High-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

## 1.3 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

- 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
- 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

- 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
- 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
- 3. Submit Samples on the following substrates for Architect's review of color and texture only:
  - a. Concrete Unit Masonry: 4-by-8-inch Samples of masonry, with mortar joint in the center, for each finish and color.
  - b. Finished Wood: 12-inch-square Samples for each species on actual material.
  - c. Metal: 4-inch-square Samples of flat metal and 8-inch-long Samples of solid metal for each color and finish.

C. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

#### 1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type and color of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.
  - 1. Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
    - a. Wall Surfaces: Provide samples on at least 100 sq. ft. of wall surface.
    - b. Small Areas and Items: The Architect will designate an item or area as required.
  - 2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
    - a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.
  - 3. Final approval of colors will be from job-applied samples.

#### 1.5 PRODUCT HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.
  - 7. Color name and number.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

#### 1.6 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.7 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to area designated by Owner.
  - 1. Quantity: Furnish the Owner with unopened containers of 2 gallon of each material and color applied.
    - a. Provide not less than 1 gallon for each part of multi-part formulations such as epoxy coatings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products in the paint schedules.
- B. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
  - 1. The Sherwin-Williams Company (SW).
  - 2. PPG Architectural Finishes, Inc. (PPG).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Provide systems indicated. Where substrates are required to be finished, but no system is specified for that particular substrate, employ finish system most closely related to that scope of work but modified with appropriate primers. In the case of components on walls, use system for adjacent wall or trim as determined by Architect. In the case of components on or suspended from ceilings or decks, use semigloss paint system.
- C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- D. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- E. Colors: Match colors indicated by reference to manufacturer's color designations.
  - 1. Provide contrasting colors for different elements exposed at ceiling level as selected by Architect, including steel trusses, roof deck, and ductwork.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

### 3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
  2. Mask surfaces and construction adjacent to paint application areas to prevent paint from
  3. Preparing Previously Painted Surfaces: Remove existing paint from surfaces indicated using scrapers or chemical paint stripper as follows:
    - a. Strip loose, chipped, alligatored or otherwise deteriorated paint using methods that will not damage existing surfaces.
    - b. Remove paint to sound substrate. Sound, well-adhered paint may remain on surface.
    - c. Rub steel surfaces to remove rust bloom, and solvent clean prior to priming.
    - d. Allow surfaces to dry and sand smooth.
    - e. Clean surfaces so they are free of dust and dirt.
    - f. Fill cracks, gouges and nail holes with suitable filler prior to application of first coat.
    - g. Complete surface preparation to produce a smooth, uniform substrate suitable for application of primer and finish coats specified.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
1. Provide barrier coats over incompatible primers or remove and reprime.
  2. Cementitious Materials: Prepare concrete and masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - a. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
    - b. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
  3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
    - a. When transparent finish is required, backprime with spar varnish.



4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
    - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
    - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
    - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
  5. Architectural Exposed Structural Steel (AESS): Fill pits and mill marks with automotive body filler. Sand smooth so no evidence of filling is visible after paint is applied.
  6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
  7. Stainless Steel: Mechanically abrade metal surface to create surface profile suitable for adhesion of paint, using No. 80 grit sandpaper and power sander.
    - a. Wipe abrade surface with fast-drying thinner such as denatured alcohol or lacquer thinner.
- D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### 3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the schedules.
  2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  3. Provide finish coats that are compatible with primers used.
  4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convactor covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
  5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
  7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
  9. Sand lightly between each succeeding enamel or varnish coat.

- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  - 1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  - 2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  - 3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
  - 1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
  - 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer. Use application rate to achieve finished dry film thickness (DFT) as indicated for each coat.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
  - 1. Piping, pipe hangers, and supports.
  - 2. Heat exchangers.
  - 3. Tanks.
  - 4. Ductwork.
  - 5. Insulation.
  - 6. Supports.
  - 7. Motors and mechanical equipment.
  - 8. Accessory items.
- G. Electrical items to be painted include, but are not limited to, the following:
  - 1. Conduit and fittings.
  - 2. Switchgear.
  - 3. Panelboards.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
  - 1. Provide a smooth, uniform finish, appearance, and coverage. Spotting, laps, roller marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
  - 2. Spray application will not be permitted unless combined with back rolling or squeegeeing. Do not thin filler. Apply sufficient material to allow back rolling or squeegeeing to fill surface.

3. Where two filler coats are scheduled, allow first coat to fully dry before application of second. Back roll or squeegee both coats.
  4. Do not use squeegee for scored unit masonry; backroll in manner that prevents buildup of block filler in score joints.
  5. Extend block filler coats the full extent of exposed surfaces. Protect adjacent surfaces.
- I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

### 3.4 EXTERIOR PAINT SCHEDULE

- A. General: Provide the finish systems scheduled for each material type indicated, applied at spreading rate recommended by manufacturer to achieve the total dry film thickness (DFT) listed.
1. Provide 2 finish coats over the listed base coats (primer, filler, bond coat) except as otherwise indicated.
- B. Exterior Concrete, Stucco, and Masonry (Other than Concrete Masonry Units):
1. Elastomeric Finish:
    - a. Primer: Alkali-resistant, exterior, acrylic-latex primer or surface conditioner.
      - 1) SW: Loxon Concrete & Masonry Primer, LX02 Series.
      - 2) PPG: Perma-Crete Interior/Exterior Alkali Resistant Primer 4-603XI.
    - b. First and Second Coats: High build elastomeric finish.
      - 1) SW: Conflex XL Elastomeric High Build Coating, A5-400 Series; 7.5 mils DFT.
      - 2) PPG: Perma-Crete Pitt-Flex Elastomeric Coating.
- C. Exterior Ferrous Metal:
1. Gloss, Urethane Finish:
    - a. Primer: Provide primer over bare metal and over shop-applied primers.
      - 1) SW: Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series.
      - 2) PPG: Pitt-Tech Plus 4020 PF
    - b. First and Second Coats: Gloss urethane finish.
      - 1) SW: WB Alkyd Urethane Enamel, B53 Semi-Gloss.
      - 2) PPG: Pitt Tech Plus Waterborne Acrylic, Semi-Gloss 4216HP

### 3.5 INTERIOR PAINT SCHEDULE

- A. General: Provide the finish systems scheduled for each material type indicated, applied at spreading rate recommended by manufacturer to achieve the total dry film thickness (DFT) listed.
1. Provide 2 finish coats over the listed base coats (primer, filler, bond coat) except as otherwise indicated.

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- B. Interior Concrete Walls: Allow to cure minimum 30 days.
1. Eggshell, Water Based Epoxy Finish:
    - a. Primer:
      - 1) SW: Loxon Concrete and Masonry Primer, 2.0-3.0 mils DFT.
      - 2) PPG: Perma Crete Primer 4603XI
    - b. First and Second Coats: Semigloss acrylic epoxy finish.
      - 1) SW: ProIndustrial PreCatalyzed WaterBased Epoxy K-46, 2.5-3.0 mils DFT.
      - 2) PPG: Pitt-Glaze WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy
- C. Interior Concrete Masonry Units (CMU):
1. Semigloss, Water Based, Two Part Epoxy Finish: provide the following in corridors, janitor closets, mechanical rooms, toilet rooms, locker rooms and receiving rooms.
    - a. Block Filler: Two Coats acrylic latex high build block filler.
      - 1) SW: PrepRite Block Filler, B25W25.
      - 2) PPG: Speedhide Latex Block Filler 6-15XI.
    - b. First and Second Coats: Semigloss acrylic epoxy finish.
      - 1) SW: ProIndustrial Pre-Catalyzed Water Based Epoxy, 2.5-3.0 mils DFT.
      - 2) PPG: Pitt-Glaze WB Interior Pre-Catalyzed Water-borne Acrylic Epoxy, 2.0-5.0 mils DFT.
  2. Low Luster, Acrylic-Enamel Finish: provide the in locations not specified above for epoxy.
    - a. Block Filler: Two Coats acrylic latex high build block filler.
      - 1) SW: Prep Rite Block Filler B25W25
      - 2) PPG: Speedhide Latex Block Filler 6-15XI.
    - b. First and Second Finish Coats: Low-luster acrylic-latex interior enamel.
      - 1) SW: ProMar 200 Zero VOC , Eg-Shel, 1.6 mils DFT.
      - 2) PPG: Speedhide Zero Interior Latex Eggshell 6-4310XI.
- D. Gypsum Board Ceilings and Soffits:
1. Flat Acrylic, Low-VOC Finish:
    - a. Primer:
      - 1) SW: ProMar Ceiling Paint flat, 1.1 mils DFT.
      - 2) PPG: Speedhide Zero Interior Latex Primer 6-4900XI, 1.4 mils DFT.
    - b. First and Second Coats:
      - 1) SW: ProMar Ceiling Paint flat ; 4.6 mils DFT.
      - 2) PPG: Speedhide Zero Interior Latex Flat 6-5110, 2.0-4.0 mils DFT.
- E. Gypsum Board Walls.
1. Low-Luster, Acrylic-Enamel, Low-VOC Finish:
    - a. Primer:
      - 1) SW: ProMar 200 Zero Primer, 1.1 mils DFT.
      - 2) PPG: Speedhide Zero Interior Latex Primer 6-4900, 1.4 mils DFT.
  2. First and Second Coats:
    - 1) SW: ProMar 200 Zero VOC, Eggshell, 1.5 mils DFT.
    - 2) PPG: Speedhide Zero Interior Latex Eggshell, 6-5310, 1.0-3.0 mils DFT.
- F. Ferrous and Non-Ferrous Metal Components at Ceiling Level: Apply the following coating system to exposed roof trusses and other structural steel in exposed high areas.
1. Dry Fall, Acrylic Flat Finish: Where colors indicated exceed manufacturer's recommended pigment proportions, use semi-gloss paint system specified for interior ferrous metal.
    - a. Primer: Metal primer.
      - 1) SW: ProIndustrial Pro-cryl, Universal Primer, B50, 2.0-5.0 mils DFT.
      - 2) PPG: Pitt Tech Plus EP DTM Acrylic Primer 90-1912, 2.2-3.5 mils DFT.
  2. First and Second Coats: flat dry fall finish.
    - 1) SW: Low VOC Waterborne Acrylic Dryfall Flat, B42, 3.5-5.0 mils DFT.

- 2) PPG: Speedhide Super Tech Flat Acrylic Dry Fall, 1.5-2.0 mils DFT.
  - G. Interior Ferrous and Non-Ferrous Metal: Apply the following coating system to interior ferrous metal not scheduled to receive another coating.
    - 1. Semigloss, Acrylic-Enamel, Low-VOC Finish:
      - a. Primer:
        - 1) SW: ProIndustrial ProCryl Universal Primer.
        - 2) PPG: Pitt Tech Plus Primer/ Finish 4020 PF, 2.2-3.5 mils DFT.
      - b. First and Second Coats:
        - 1) SW: ProIndustrial WB Acrylic Urethane Enamel, Semigloss, B53, 1.4 mils DFT.
        - 2) PPG: Pitt-Tech Plus EP Interior/Exterior Acrylic Gloss DTM Industrial Enamel, Semi-Gloss, 2.0-4.0 mils DFT.
  - H. Painted Interior Woodwork:
    - 1. Semigloss, Latex-Enamel Finish:
      - a. Primer: Latex-based, interior enamel undercoater.
        - 1) SW: ProMar 200 Zero VOC Primer; 1.6 mils DFT.
        - 2) PPG: Seal Grip Gripper Acrylic Universal Primer 17-921XI, 1.4 mils DFT.
      - b. First and Second Coats: Semigloss, Latex, interior enamel.
        - 1) SW: Solo 100% Acrylic Latex, Semi-gloss, 1.4 mils DFT.
        - 2) PPG: Speedhide Zero Interior Latex Semi-Gloss, 6-5510, 1.4 mils DFT
  - I. Gypsum Board, Moisture Conditions:
    - 1. Water-Reducible Epoxy Coating System: Provide the following for gypsum board surfaces located in toilet rooms.
      - a. Primer: Latex-based, interior primer.
        - 1) SW: Extreme Block Waterbased Stain Blocking Primer; 1.6 mils DFT.
        - 2) PPG: Seal Grip Gripper Water Based Stain Blocking Primer 17-921XI, 1.4 mils DFT.
      - b. First and Second Coats: Semi-gloss epoxy finish.
        - 1) SW: ProIndustrial Pre-Catalyzed Water-Based Epoxy; B70-200 Series; 3.0 DFT
        - 2) PPG: Pitt-Glazed WB1 Interior Pre-Catalyzed Water-borne Acrylic Epoxy, 2.0-5.0 mils DFT.
- 3.6 CLEANING AND PROTECTION
- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
    - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.
  - B. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
  - C. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
    - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

**END OF SECTION 09 91 00**

## **SECTION 12 24 13 - ROLLER WINDOW SHADES**

### **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. Manually operated, roll-up fabric interior window shades including mounting and operating hardware (Ref. Reflected Ceiling Plans for locations, and related Details)

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples: For each exposed product and for each color and texture specified, 10 inches long.
- D. Samples for Initial Selection: For each type and color of shadeband material.
  - 1. Include Samples of accessories involving color selection.
- E. Roller-Shade Schedule: Use same designations indicated on Drawings.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of shadeband material, signed by product manufacturer.
- C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For roller shades to include in maintenance manuals.

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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. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than 2 units.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following and not limited to:
  - 1. Draper Inc. – Clutch-Operated FlexShade NEXD (Basis-of-Design)
  - 2. Hunter Douglas Contract. (Equal to Draper)
  - 3. MechoShade Systems, Inc. (Equal to Draper)
  - 4. Jacksons Window Shoppe (Equal to Draper)
- B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Heavy-Duty Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation.

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- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated. Provide limit stops to prevent shade from being raised or lowered too far.
1. Bead Chains: Manufacturer's standard.
    - a. Loop Length: Full length of roller shade.
    - b. Limit Stops: Provide upper and lower ball stops.
    - c. Chain-Retainer Type: Chain tensioner, jamb mounted
    - d. Spring-assist bead chain clutch mechanism: Adjustment-free system includes spring-assist components to reduce lifting forces required to raise shade.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
1. Roller Drive-End Location: Right side of inside face of shade
  2. Direction of Shadeband Roll: Regular, from back of roller.
  3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- F. Shadebands:
1. Shadeband Material: Light-filtering Series
  2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
    - a. Type: Enclosed in sealed pocket of shadeband material
    - b. Color and Finish: As selected by Architect from manufacturer's full range
- G. Installation Accessories:
1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
    - a. Shape: L-shaped
    - b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open, but not less than 3 inches.
  2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
    - a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than 3 inches



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3. Endcap Covers: To cover exposed endcaps.
4. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701 Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
  1. Reference drawings, if not noted, provide the following Basis of Design:
    - a. Mermet E Screen - Basketweave
    - b. Openness Factor: 1 percent.
    - c. Color: (to be selected from manuf. full range of colors)

2.4 ROLLER-SHADE FABRICATION DRAP

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F.
  1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch plus or minus 1/8 inch.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:
  1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4 provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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3.2 ROLLER-SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION

**SECTION 12 36 61 – SOLID SURFACE MATERIAL**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Solid surface material - Window Sills

**1.3 ACTION SUBMITTALS**

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
  - 1. Show locations and details of joints.
  - 2. Show direction of directional pattern, if any.
- C. Samples: For each type of material exposed to view in manufacturer's standard size.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For fabricator.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

**1.6 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. General Note: Refer to "Interior Finish Legend" on drawings for manufacturers, products, styles, and colors.
- B. Solid Surface Material - Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Basis of Design: Corian Solid Surface, final color to be determined by architect, up to price level 2.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 WINDOW SILL FABRICATION

- A. Fabricate window sill according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Custom.
- B. Configuration:
  - 1. Front: Straight, slightly eased at top.
- C. Sills: 1/2-inch-thick, solid surface material.
- D. Fabricate tops with field-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- E. Joints: Fabricate countertops without joints to greatest extent possible.
- F. Joints: When required, fabricate countertops in sections for joining in field.
  - 1. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.

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- B. Sealant for Window Sills: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- C. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- D. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- E. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION