

## SECTION 077100 - ROOF SPECIALTIES

## PART I - GENERAL

## I.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.

## I.2 SUMMARY

- A. Section Includes:

- 1. Copings.
- 2. Roof-edge specialties.
- 3. Roof-edge drainage systems.
- 4. Reglets and counterflashings.

- B. Related Requirements:

- 1. See Civil & Plumbing drawings for downspout boots.
- 2. **[Section 061000 "Rough Carpentry"] [Section 061053 "Miscellaneous Rough Carpentry"]** for wood nailers, curbs, and blocking.
- 3. Section 075423 "TPO for roof-edge drainage-system components (copings, roof edge specialties, etc) provided by TPO manufacturer.
- 4. Section 076200 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
- 5. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

- C. Preinstallation Conference: Conduct conference at Project Site

- 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
- 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
- 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

## I.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: For roof specialties.
  - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
  - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
  - 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
  - 4. Detail termination points and assemblies, including fixed points.
  - 5. Include details of special conditions.
- C. Samples: For each type of roof specialty and for each color and texture specified.
- D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- E. Samples for Verification:
  - 1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
  - 2. Include **[copings]** **[roof-edge specialties]** **[roof-edge drainage systems]** **[reglets and counterflashings]** made from **12-inch (300-mm)** lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

#### I.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.

#### I.5 CLOSEOUT SUBMITTALS

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

#### I.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are **[FM Approvals listed for specified class]** **[and]** **[SPRI ES-I tested to specified design pressure]**.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 075423 TPO

## I.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.

## I.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.

## I.9 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section **075423 TPO**
- 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. FM Approvals' Listing: Manufacture and install **[copings]** **[roof-edge specialties]** that are listed in FM Approvals' "RoofNav" and approved for windstorm classification of location of Project. Identify materials with FM Approvals' markings.
- C. SPRI Wind Design Standard: Manufacture and install **[copings]** **[roof-edge specialties]** tested according to SPRI ES-I and capable of resisting the following design pressures:
  - 1. Design Pressure: **[As indicated on Drawings]**

- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - I. Temperature Change (Range): [**120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**] <Insert temperature range>, material surfaces.

## 2.2 COPINGS

- A. Metal Copings: See Section 075423 TPO

## 2.3 ROOF-EDGE SPECIALTIES

- A. Canted Roof-Edge [**Fascia**] Manufactured, two-piece, roof-edge fascia consisting of [**snap-on**] [**compression-clamped**] metal fascia cover in section lengths not exceeding [**12 feet (3.6 m)**] <Insert dimension> and a continuous formed galvanized-steel sheet cant, **0.028 inch (0.71 mm)** thick, minimum, with extended vertical leg terminating in a drip-edge cleat. Provide matching corner units.
  - I. Provided by TPO manufacturer
- B. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding [**12 feet (3.6 m)**] <Insert dimension> and a continuous metal receiver with integral drip-edge cleat to engage fascia cover [**and secure single-ply roof membrane**]. Provide matching corner units.
  - I. Provided by TPO manufacturer

## 2.4 ROOF-EDGE DRAINAGE SYSTEMS

- A. **ATAS** International, or equal.
- B. Gutters: Manufactured in uniform section lengths not exceeding [**12 feet (3.6 m)**] <Insert dimension>, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least **1 inch (25 mm)** 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: [**0.050 inch (1.27 mm)**] thick.
  - 2. Gutter Profile: [**Half-round highback**] according to SMACNA's "Architectural Sheet Metal Manual."
  - 3. Corners: Factory mitered and [**soldered**]
  - 4. Gutter Supports: [**Gutter brackets or Straps**] with finish matching the gutters.
- C. Downspouts: [**Plain rectangular**] complete with [**machine-crimped**] [**mitered**] [**smooth-curve**] elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
  - I. Zinc-Coated Steel: Nominal [**0.028-inch (0.71-mm)**] [**0.034-inch (0.86-mm)**] <Insert value> thickness.

2. Formed Aluminum: [0.032 inch (0.81 mm)] [0.040 inch (1.02 mm)] [0.050 inch (1.27 mm)] [0.063 inch (1.60 mm)] <Insert value> thick.
  3. Extruded Aluminum: [0.125 inch (3.18 mm)] <Insert value> thick.
  4. Copper: [16 oz./sq. ft. (0.55 mm thick)] <Insert value>.
- D. Conductor Heads: Manufactured conductor heads, each with flanged back and stiffened top edge, and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout[, exterior flange trim,] [and] [built-in overflow].
1. Zinc-Coated Steel: Nominal [0.028-inch (0.71-mm)] <Insert value> thickness.
  2. Formed Aluminum: [0.032 inch (0.81 mm)] <Insert value> thick.
  3. Stainless Steel: [0.016 inch (0.40 mm)] <Insert value> thick.
  4. Copper: [16 oz./sq. ft. (0.55 mm thick)] <Insert weight (thickness)>.

## 2.5 REGLETS AND COUNTERFLASHINGS

- A. **BY** TPO manufacturer
- B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
1. Zinc-Coated Steel: Nominal [0.022-inch (0.56-mm)] [0.028-inch (0.71-mm)] <Insert value> thickness.
  2. Formed Aluminum: [0.024 inch (0.61 mm)] [0.050 inch (1.27 mm)] <Insert value> thick.
  3. Stainless Steel: [0.019 inch (0.48 mm)] [0.025 inch (0.64 mm)] <Insert value> thick.
  4. Copper: [16 oz./sq. ft. (0.55 mm thick)] <Insert weight (thickness)>.
  5. Corners: Factory mitered and [soldered] [continuously welded] [mechanically clinched and sealed watertight].
  6. 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.
  7. Stucco Type, Embedded: Provide reglets with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
  8. 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.
  9. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
  10. Multiuse Type, Embedded: For multiuse embedment in [cast-in-place concrete] [masonry mortar joints].
- C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches (100 mm) and in lengths not exceeding [12 feet (3.6 m)] <Insert dimension> designed to snap into [reglets] [or] [through-wall-flashing receiver] and compress against base flashings with joints lapped, from the following exposed metal:
1. Zinc-Coated Steel: Nominal [0.022-inch (0.56-mm)] [0.028-inch (0.71-mm)] <Insert value> thickness.
  2. Formed Aluminum: [0.024 inch (0.61 mm)] [0.032 inch (0.81 mm)] <Insert value> thick.
  3. Stainless Steel: [0.019 inch (0.48 mm)] [0.025 inch (0.64 mm)] <Insert value> thick.
  4. Copper: [16 oz./sq. ft. (0.55 mm thick)] <Insert weight (thickness)>.
- D. Accessories:

1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

## 2.6 MATERIALS

- A. Aluminum Sheet: **ASTM B 209 (ASTM B 209M)**, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- B. Aluminum Extrusions: **ASTM B 221 (ASTM B 221M)**, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:

## 2.7 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
  1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
  2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

## 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: 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. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - c. Two-Coat Mica Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended mica flakes 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.
- d. Three-Coat Metallic Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - e. 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 (0.013 mm)**.
2. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.
  3. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.
- 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 [2604] [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. Three-Coat Fluoropolymer: AAMA [2604] [2605]. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - c. Two-Coat Mica Fluoropolymer: AAMA [2604] [2605]. Fluoropolymer finish with suspended mica flakes 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.
    - d. Three-Coat Metallic Fluoropolymer: AAMA [2604] [2605]. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - e. 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 (0.013 mm)**.
  2. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.
  3. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.

## 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 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  - 4. Torch cutting of roof specialties is not permitted.
  - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of **[uncoated aluminum] [and] [stainless-steel]** roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
  - 1. Space movement joints at a maximum of **[12 feet (3.6 m)]** **<Insert dimension>** with no joints within **[18 inches (450 mm)]** **<Insert dimension>** of corners or intersections unless otherwise indicated on Drawings.
  - 2. When ambient temperature at time of installation is between **40 and 70 deg F (4 and 21 deg C)**, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate **[wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws]** **[substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance]** **<Insert size requirement>**.
- 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 (4 deg C)**.
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of **1-1/2 inches (38 mm)**; however, reduce pre-tinning where pre-tinned



surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

### 3.3 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.

### 3.4 ROOF-EDGE SPECIALITIES INSTALLATION

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

### 3.5 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 (305 mm)] [24 inches (610 mm)] [30 inches (762 mm)] <Insert dimension> apart. Attach ends with rivets and [seal with sealant] [solder] to make watertight. Slope to downspouts.
  - I. Install gutter with expansion joints at locations indicated but not exceeding [50 feet (15.2 m)] <Insert dimension> 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 (25 mm) away from walls; locate fasteners at top and bottom and at approximately [60 inches (1500 mm)] o.c.
  - I. 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 042000 "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 (100 mm)** over top edge of base flashings.
- D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap **4 inches (100 mm)** over top edge of base flashings. Lap counterflashing joints a minimum of **4 inches (100 mm)** and bed with butyl sealant. Fit counterflashings tightly to base flashings.

### 3.7 CLEANING AND PROTECTION

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

END OF SECTION 077100