SECTION 077123 - MANUFACTURED GUTTERS AND DOWNSPOUTS

Use this section for preformed (off the shelf) gutters. Use Section 076223 for heavy duty gutters.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Roof-edge drainage systems.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

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

* + - * 1. Sustainable Design Submittals:

Retain "Shop Drawings" paragraph below for Work that involves custom fabrication or if manufacturer's product data are inadequate.

* + - * 1. Shop Drawings: For roof-edge drainage systems.

Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.

Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.

Detail termination points and assemblies, including fixed points.

Include details of special conditions.

* + - * 1. Samples: For each type of roof specialty and for each color and texture specified.
				2. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
				3. Samples for Verification:

Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

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

* + - * 1. Qualification Data: For manufacturer.
				2. Product Certificates: For each type of roof specialty.
				3. Product Test Reports: For [copings] [and] [roof-edge flashings], for tests performed by a qualified testing agency.
				4. Sample Warranty: For manufacturer's special warranty.
			1. CLOSEOUT SUBMITTALS
				1. Maintenance Data: For roofing specialties to include in maintenance manuals.
			2. QUALITY ASSURANCE
				1. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are [**FM Approvals listed for specified class] [and] [SPRI ES-1 tested to specified design pressure**].
				2. Retain "Source Limitations" Paragraph below if required for Project. Coordinate with "Warranty" Article of this Section and requirements of Project roofing-membrane Section.
				3. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section <**Insert Section number and title**>.
				4. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.

Retain one of first three subparagraphs below for large-scale mockup; insert other mockup requirements or revise if required. Indicate portion of building represented by mockup on Drawings, or draw mockup as separate element. Coordinate with mockup requirements of other Sections if applicable.

Build mockup of typical roof edge as shown on Drawings.

Build mockup of typical roof edge as part of Integrated Exterior Mockup.

Build mockup of typical roof edge, including [**fascia] [gutter] [and] [downspout] <Insert item**>, approximately [**10 feet] <Insert dimension**> long, including supporting construction, seams, attachments,[ **underlayment**,] and accessories.

Retain first subparagraph below if mockups are not only for establishing appearance factors.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

Retain subparagraph below if the intention is to make an exception to the default requirement for demolishing and removing mockups.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Do not store roof-edge drainage systems in contact with other materials that might cause staining, denting, or other surface damage. Store away from uncured concrete and masonry.
				2. Protect strippable protective covering on roof-edge drainage systems from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.
			2. FIELD CONDITIONS
				1. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
				2. Coordination: Coordinate roof-edge drainage systems 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.
			3. WARRANTY

Retain "Special Warranty on Painted Finishes" paragraph below for factory-coated metal. Delete if metal is left uncoated or field finished. Coordinate with finishes retained in Part 2.

* + - * 1. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof-edge drainage systems that show evidence of deterioration of factory-applied finishes within specified warranty period.

Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

Color fading more than 5 Delta E units when tested according to ASTM D2244.

Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

Cracking, checking, peeling, or failure of paint to adhere to bare metal.

Finish Warranty Period: 20 years from date of Substantial Completion.

1. PRODUCTS
	* + 1. PERFORMANCE REQUIREMENTS
				1. General Performance: Roof-edge drainage systems 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.
				2. 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.

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

* + - 1. ROOF-EDGE DRAINAGE SYSTEMS
				1. Gutters: Manufactured in uniform section lengths not exceeding 10 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.

Aluminum Sheet: 0.27 inch thick.

Gutter Profile: Style K according to SMACNA's "Architectural Sheet Metal Manual."

Corners: Factory mitered and mechanically clinched and sealed watertight.

Gutter Supports: Gutter brackets with finish matching the gutters.

* + - * 1. Downspouts: 3 by 4 inch, corrugated 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.

Lengths: 8 or 10 feet.

Formed Aluminum: 0.027 inch thick.

* + - * 1. Aluminum Finish: [**Mill] [Two-coat fluoropolymer**].

Delete "Color" subparagraph below for mill finish.

Color: [**White ][Dark brown**].

* + - 1. MATERIALS
				1. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
			2. MISCELLANEOUS MATERIALS
				1. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

* + - * 1. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

Retain "Butyl Sealant" paragraph below for concealed sealant use in metal joints with limited movement.

* + - * 1. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.
				2. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187.
				3. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
			1. FINISHES
				1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
				2. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
				3. 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.
				4. Coil-Coated Aluminum Sheet Finishes:

High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (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[ **for seacoast and severe environments**].

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.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
				2. Examine walls, roof edges, and parapets for suitable conditions for roof-edge drainage systems.
				3. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
				4. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION, GENERAL
				1. Install roof-edge drainage systems according to manufacturer's written instructions. Anchor roof-edge drainage systems securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.

Install roof-edge drainage systems level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.

Provide uniform, neat seams with minimum exposure of solder and sealant.

Install roof-edge drainage systems to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

Torch cutting of roof-edge drainage systems is not permitted.

Do not use graphite pencils to mark metal surfaces.

* + - * 1. 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.

Coat concealed side of uncoated aluminum roof-edge drainage systems with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.

Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof-edge drainage systems for waterproof performance.

* + - * 1. Expansion Provisions: Allow for thermal expansion of exposed roof-edge drainage systems.

Space movement joints at a maximum of 10 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.

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.

* + - * 1. Fastener Sizes: Use fasteners of sizes that penetrate [**wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws] [substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance**].
				2. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
				3. 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.
			1. INSTALLATION OF ROOF-EDGE DRAINAGE-SYSTEM
				1. 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.
				2. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 36 inches apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.

Install gutter with expansion joints at locations indicated but not exceeding [50 feet] apart. Install expansion-joint caps.

Install continuous leaf guards on gutters with noncorrosive fasteners, [removable] [hinged to swing open] for cleaning gutters.

* + - * 1. 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.

Provide elbows at base of downspouts at grade to direct water away from building.

Connect downspouts to underground drainage system indicated.

* + - 1. PROTECTION
				1. Remove temporary protective coverings and strippable films as roof-edge drainage systems are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof-edge drainage systems in a clean condition during construction.
				2. Replace roof-edge drainage systems that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077123