Section 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes all sheet metal Work including sheet metal flashings, gutters and downspouts, reglets, scuppers, roof edge flashing, copings, base flashing, counter flashing and roof drain pans.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. The requirements of the following sections apply to the Work of this section. Other sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. General Requirements
2. Section 07900, Joint Sealants

1.3 REFERENCE CODES, REGULATIONS, AND STANDARDS

A. All Work specified herein shall meet or exceed the applicable requirements of the publications referenced in this section. The publication references are summarized in this article for convenience. The CONTRACTOR shall be responsible for compliance with all requirements referenced in this section, even if they are not included in this summary article. If there is a conflict between the requirements of the referenced publications and other provisions of the Specifications, the other provisions shall prevail.

B. Comply with the applicable editions of the following codes, regulations and standards.

1. Codes and Regulations:

29 CFR 1910	Code of Federal Regulations, Title 29, Part 1910, U.S. Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Code of Federal Regulations, Title29, Part 1926, US Safety and Health Regulations for Construction (OSHA)
CCR	California Code of Regulations, Title 8, Industrial Relations (Cal/OSHA)
CCR	California Code of Regulations, Title 24, Building Standards Code

2. Industry Standards:

ASTM B 32	Standard Specification for Solder Metal
ASTM B 209	Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM C 920	Standard Specification for Elastomeric Joint Sealants
ASTM C 1311	Standard Specification for Solvent Release Sealants
ASTM F 2329	Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts and Special Threaded Fasteners

ASTM D 1187	Standard Specification for Asphalt-Base Emulsion for Use as Protective Coatings for Metal
SPRI ES-1	Wind Design Standard for Edge System Used with Low Slope Roofing Systems

3. Other Standards:

NRCA	National Roofing Contractors Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association, Inc.
SPRI	Single Ply Roofing Industry

C. Comply with the applicable reference specifications as directed in the General Requirements and the Additional General Requirements.

D. The construction and installation of all equipment and materials shall comply with all provisions of the codes, regulations and standards specified above, as applicable, and other applicable Federal, State and local codes, laws and regulations.

1. Local authorities:

   a. City of **[Fountain Valley] [Huntington Beach]**, CA, Fire Department

   b. City of **[Fountain Valley] [Huntington Beach]**, CA, Building and Safety Department

   c. Orange County Fire Authority

1.4 SUBMITTALS

A. Submittals shall be made in accordance with the General Requirements, Additional General Requirements and as specified herein.

B. Submit the following under this section number. Reference the section number in the submittal Item Description (e.g. [01783] Draft Individual Equipment Service Manual (ESM).

1. Quality Assurance

   a. Fabricator qualifications per article "Quality Assurance".

2. Product Data:

   a. For each type of product.

3. Shop Drawings:

   a. Shop drawings showing materials, gauges, finishes, layout, jointing, profiles, fasteners, fabrication of special shapes, and method of attachment to adjacent construction shall be submitted.

   b. Include plans, elevations, sections, and attachment details.

   c. Distinguish between shop- and field-assembled work.

   d. Include identification of finish for each item.

   e. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining Work.

1.5 QUALITY ASSURANCE

A. Qualifications

1. 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.

a. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

B. Mockups: Build mockups to verify selections made under sample submittals to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

1. Build mockup of typical roof coping.

PART 2 - PRODUCTS

2.1 GENERAL

A. 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 shall be aluminum unless otherwise specified or shown. Sheet metal Work in connection with roofing shall be in accordance with roofing manufacturer’s published specifications.

C. All sheet metal flashings necessary to make building weathertight shall be provided, whether or not specified or shown.

D. Metal flashing, counterflashing and gravel stops shall be fabricated of aluminum as specified in this section

E. 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.

F. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on drawings.

2.2 MATERIALS

A. Aluminum

1. Aluminum shall be 0.032-inch minimum thickness and shall conform to ASTM B 209, alloy 3003-H 14, with "Mill Finish". Thickness of aluminum to be welded shall be as necessary for welding method being used. Thickness of aluminum to be used shall be as necessary for the application and as indicated by SMACNA.

B. Underlayment Materials

1. Underlayment materials used for sheet metal flashing in conjunction with roofing shall be of the type as approved and recommended by the roofing manufacturer.

C. Miscellaneous Materials

1. 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.

2. 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.

a. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

(1) 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.

(2) Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

(3) Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

D. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

E. Sealant Tape:

1. Pressure-sensitive, one hundred (100) percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape one-half (1/2)-inch-wide and one-eighth (1/8) inch thick.

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

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

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

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

2.3 MANUFACTURED REGLETS

A. Reglets: Units shall be of aluminum and of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated and with interlocking counterflashing on exterior face, of same metal as reglet.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following or equal:

a. Cheney Flashing Company.

b. Fry Reglet Corporation.

c. Heckmann Building Products, Inc.

2. Material: Aluminum, 0.032-inch-thick, mill finish.

2.4 FABRICATION

A. Shop Fabrication Requirements

1. All aluminum shall be welded where specified or shown. Welding shall conform to reference standards.

2. Galvanized steel corner joints shall be soldered. Other joints shall be as specified, or as required by the reference standards.

3. All Work and finishes shall be protected from scratches and abrasions.

4. All flashings, reglets, and counter-flashing shall be fabricated by the same manufacturer and be installed as a complete flashing system. All flashings shall be creased longitudinally or otherwise formed with sufficient spring action to hold bottom edges firmly against base flashing or similar material.

5. Intersecting corners of copings shall be accurately fitted and welded. Corners may be shop-assembled, manufactured, or extruded units.

6. Gutters and downspouts shall be of sizes as shown on drawings.

B. Fabrication - General

1. 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.

a. Obtain field measurements for accurate fit before shop fabrication.

b. 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.

c. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

2. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

a. Form expansion joints of intermeshing hooked flanges, not less than one (1)-inch deep, filled with butyl sealant concealed within joints.

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

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

5. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

6. 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.

7. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum ninety-six (96)-inch- long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Fabricate from the following materials:

a. Aluminum: 0.040 inch thick

2. Accessories: 14-gauge stainless steel wire-basket downspout strainer.

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

1. Aluminum: 0.040 inch thick.

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

1. PVC-Coated Aluminum: Materials provided by or recommended by roofing manufacturer.

2. Materials provided by or recommended by the roofing manufacturer.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop): Fabricate in minimum ninety-six (96)-inch long, but not exceeding twelve (12)-footlong sections. Furnish with six (6)-inch- wide, joint cover plates.

1. Fabricate from the Following Materials:

a. PVC-Coated Aluminum: Materials provided by or recommended by the roofing manufacturer.

B. Copings: Fabricate in minimum ninety-six (96)-inch- long, but not exceeding twelve (12)-feet- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, solder or weld watertight. Shop fabricate interior and exterior corners.

1. Fabricate from the Following Materials:

a. PVC-Coated Aluminum: Materials provided by or recommended by roofing manufacturer.

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

1. Aluminum: 0.040 inch thick.

D. Counterflashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.

2. PVC-Coated Aluminum: Materials provided by or recommended by roofing manufacturer.

E. The roof penetrations shall be flashed per the roofing manufacturer’s requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Space cleats not more than twelve (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.

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 aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of ten (10) feet with no joints within twenty-four (24) inches of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

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

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

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

F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 07900, Joint Sealants.

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.

2. Do not use torches for soldering.

3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

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

3.2 ROOF DRAINAGE SYSTEM INSTALLATION

A. General:

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

B. Hanging Gutters:

1. Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

2. Install gutter with expansion joints at locations indicated, but not exceeding, thirty-four (34) feet apart. Install expansion-joint caps.

C. Downspouts:

1. Join sections with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately sixty (60) inches on center.

D. Parapet Scuppers:

1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

3.3 ROOF FLASHING INSTALLATION

A. General:

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

B. Roof Edge Flashing:

1. Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

C. Copings:

1. Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

D. Counterflashing:

1. Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing four (4) inches over base flashing. Lap counterflashing joints minimum of four (4) inches.

3.4 CLEANING AND PROTECTION

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

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

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

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