

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Custom flashing and trim fabrications, made from the following:

1. Formed sheet metal profiles:

- ~~a. Parapet edge metal.~~
- ~~b-a.~~ Wall flashings and trim.
- ~~b.~~ Exterior soffit trim.
- c. Overhead safety pans.

2. Sheet metal materials.

3. Miscellaneous materials and accessories.

- ~~a.~~ Foam tape.

B. Related Requirements:

- ~~1. Section 04 26 13 "Masonry Veneer" for providing sheet metal flashings and trim for installation.~~
- ~~4-2.~~ Section 05 40 00 "Cold-Formed Metal Framing" for backup blocking in exterior framed walls and soffits.
- ~~2-3.~~ Section 06 10 53 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
- ~~4.~~ Section 07 27 00 "Air Barriers" for high-temperature flashing (underlayment) and air barrier materials.
- ~~5.~~ Section 07 42 13.23 "Metal Composite Material Wall Panels" for trim and flashings installed with metal panels.
- ~~6.~~ Section 07 54 23 "TPO Roofing" for parapet edge metal and scuppers.
- ~~7.~~ Division 08 for flashings installed with glazing systems.

1.2 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.

C. Coordinate integration of sheet metal into air barrier system.

1.3 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.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For sheet metal flashing and trim.
  1. Plans, elevations, sections, and attachment details.
  2. Fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
  3. Identification of material, thickness, weight, and finish for each item and location in Project.
  4. Details for forming, including profiles, shapes, seams, and dimensions.
  5. Details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  6. Details of termination points and assemblies.
  7. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
  8. Details of roof-penetration flashing.
  9. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
  10. Details of special conditions.
  11. Details of connections to adjoining work.
  12. Formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Verification: Actual sample of finished products for each type of exposed finish for sheet metal and other metal accessories.
  1. Sheet Metal Flashing and Trim: Manufacturers' standard size but not less than 6 inches square. Include finished seam with required profile. Include fasteners, cleats, clips, closures, and other attachments.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested.
  1. Drawings published by NRCA or FM Global indicating profiles compliant with requirements and submitted with Shop Drawings with incorporated requirements shall be acceptable in lieu of certificates.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Research Reports: For copings and roof edge flashing, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.
- D. Qualification Statements: For fabricator.
- E. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Entity that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of profiles with on-site supervisor with minimum 5 years' experience with installations of similar size and scope of Project.

1.8 MOCKUPS

- A. 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 flashing and trims indicated integrated into other Work, in integrated building mockup, approximately 10 ft. long, including supporting construction cleats, seams, attachments, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 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.
  - 1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
  - 2. Protect stored sheet metal flashing and trim from contact with water.
- 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.

1.10 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 Delta E units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with 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.

- B. Special Project Warranty: Submit Installer's warranty form, signed by Installer, covering the Work of this Section, including all flashings for materials and workmanship without failure with flashing remaining water- and weathertight, for the specified warranty period.
  - 1. Failures include water infiltration and water intrusion into assemblies or building envelope and into interfacing enclosure materials except those assemblies intended and designed for draining.
  - 2. Warranty Period: Two years from date of Substantial Completion.
  - 3. Flashings installed with roofing systems shall be warranted under Work of Section 07 54 23 "TPO Roofing."

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to 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 are not to rattle, leak, or loosen, and are to remain watertight.
- B. Design Requirements: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to alignments and visually to one another, and to adjoining construction. Not all conditions and installation requirements are shown. Provide flashing and trim necessary to install watertight and exclude water and moisture from cavity construction. Where required for performance requirements and installation, details shall be revised without change and considered within the scope required for the Project and shall not be cause for modifications to the Contract.
  - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval.
  - 2. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- C. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install roof edge flashings and copings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
  - 1. Design Pressure: As indicated on Drawings.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces .

## 2.2 SHEET METAL

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Sheet Metal Flashing and Trim, General:
  - 1. Prefinished Sheet Metal Flashing and Trim:
    - a. For metal trim associated with metal panels, see Section 07 42 13.23 "Metal Composite Material Wall Panels."
    - b. Aluminum Trim at curtain walls and aluminum-framed entrances storefronts to be finished the same color and finish as glazing systems in Division 08 Sections.
    - c. Exterior, where indicated to match masonry: Aluminum.
    - d. Exterior, matching black painted plywood linear wood ceiling backer: Metallic-coated sheet steel, prefinished.
    - e. Interior, Painted to Match: Metallic-coated sheet steel.
  - 2. Flashing embedded in masonry assemblies to be stainless steel.
  - 3. Flashings extending into soil or aggregate at base of walls to be stainless steel or aluminum.
  - 4. Exposure, Aluminum. Aluminum shall be
  - 5. Perforated Trim: Fabricated from aluminum sheet.
- C. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with minimum ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
  - 1. Nominal Thickness: 0.034 inch.
    - a. 0.040 inch for over 6-inch exposure.
    - b. 0.052 inch for over 10-inch exposure and for overhead drainage.
  - 2. Surface: Smooth, flat.
  - 3. For Interior Painting:
    - a. Exposed Finish: Mill phosphatized for field painting.
    - b. Concealed Finish: None required except provide flexible flashing separator in Section 06 10 53 where in contact with dissimilar metals.
  - 4. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: 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. FEVE Fluoropolymer: Two-coat fluoropolymer finish containing 100 percent FEVE resin in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 5. Color: Black to match painted plywood ceiling and soffit panels.
  - 6. 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.

- D. Aluminum Sheet: Coil-coated sheet, ASTM B209/B209M, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
1. Thickness:
    - a. 0.040-inch thick up to 3-inch exposure.
    - b. 0.050-inch thick up to and including 6-inch exposure.
    - c. 0.060-inch thick exposure over 6-inch and less than 8-inch exposure.
    - d. 0.080-0.090 inch thick for over 8-inch and up to 10-inch exposure.
  2. Surface: Smooth, flat.
  3. Exposed Coil-Coated Finish:
    - 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. FEVE Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish containing 100 percent FEVE resin in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  4. Color: As indicated to match other prefinished aluminum work or masonry.
  5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- E. Stainless Steel Sheet: ASTM A240/A240M, Type 304 , dead soft, fully annealed.
1. Nominal Thickness: 0.0250 inch.
  2. Surface: Smooth, flat.
  3. Exterior Finish:
    - a. Concealed: ASTM A480/A480M, No. 2D (dull, cold rolled).
    - b. Exposed: ASTM A480/A480M No. 4.
    - c. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

## 2.3 UNDERLAYMENT

- A. Underlayment: See Section 07 27 00 "Air Barriers."

## 2.4 MISCELLANEOUS MATERIALS

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

- a. Exposed Fasteners: Heads matching color of sheet metal with factory-applied coating.
  - 1) Exposed: Stainless steel rivets.
  - 2) Semi-Exposed: Where approved for use in Shop Drawings, provide metal-backed EPDM 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 Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.
  - a. Fasteners may be steel with corrosion resistant coating showing no red rust forming after 1,000 hours to salt spray according to ASTM B117.
3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
4. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
5. Fasteners for Zinc Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.
- C. Solder:
  1. For Zinc-Coated (Galvanized) Steel: ASTM B32, with maximum lead content of 0.2 percent.
  2. For Stainless Steel: ASTM B32, Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Foam Tape: Self-expanding acrylic-impregnated foam tape; factory coated with adhesive on both surfaces. Designed to reduce air and moisture penetration in joints.
  1. Basis-of-Design Product: EMSeal AST Hi-Acrylic, black.
  2. Size: As indicated.
- F. Elastomeric Sealant: ASTM C920, class 50/100, low modulus elastomeric silicone sealant; of type, grade, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
  1. Application: For movement joints, backer plates, lapping:
    - a. Basis-of-Design Products:
      - 1) Dowsil 790.
      - 2) Tremco Spectrem 1.
  2. Application: For sealants used as adhesive:
    - a. Basis-of-Design Products:

- 1) Dowsil 725.
- 2) Tremco Spectrem 2.

3. Application: Sealants in contact with weathersealing of Division 08 "Openings", use same product as weatherseal. Coordinate with Division 08 for products.

G. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

1. Basis-of-Design Product: Tremco JS 733+.

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 in accordance with ASTM D1187/D1187M.

#### 2.32.5 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
  2. 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.
  3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
  4. 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.
  5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
  6. Provide 4-inch surfaces for striping in flashings with membrane flashings in Section 07 27 00 "Air Barriers."
- a. Provide flanges of size required for glazing into glazing systems or for anchoring sufficiently.
- B. Fabrication Tolerances:
1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 ft. on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
  2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- 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 or specified for fabrications.
  - 2-3. For stainless steel, use non-skinning butyl sealant.



- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams:
  - 1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 2. 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.
  - 3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.

2.42.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- long, but not exceeding 12 ft. long sections. Furnish with 6-inch- wide, joint cover plates. Shop fabricate interior and exterior corners.
  - 1. Joint Style: Roofing manufacturer's standard detail. Butted with expansion space and 6-inch- wide, concealed backup plate.
  - 2. Fabricate from the following materials:
    - ~~a. Aluminum: Thickness by exposure.~~
    - b-a. TPO-Coated: Provided by Section 07 54 23 "TPO Roofing."
- B. Downspouts and Brackets: Fabricate round downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish metal hangers for downspouts.
  - 1. Downspouts: Fabricated from galvanized steel tubing 0.060-inch wall thickness; shop prime with primer in Section 09 91 13 "Exterior Painting."
    - a. Provide bent elbows welded and fittings required for connection to plumbing drains and civil discharge piping.
  - 2. Brackets: Manufactured units, fabricated from galvanized steel and finished to match downspouts.
    - a. Hanger Style: SMACNA's "Architectural Sheet Metal Manual" figure 1-35J.
      - 1) Fabricated from 2-inch wide galvanized steel sheet, 16 gage; with standoff-tab returns sized minimum 1-inch; coordinate with tab in Section 05 50 00.
      - 2) Finish: Shop prime. Field- or shop-paint in Section 09 96 00 "High Performance Coatings" to match column.

- b. Downspout bracket tab is in Section 05 50 00 "Metal Fabrications" and attached to building structural columns.
- c. Provide through bolt, 1/4-inch diameter, galvanized steel with lock washer and nut with protruding bolt length to be 1/8-inch beyond washer-nut. Paint to match after attachment.

C. Scuppers: Provided by Section 07 54 23 "TPO Roofing."

D. Scupper Sleeve: Provided by Section 07 42 13.23 "Metal Composite Material Wall Panels."

#### 2-52.7 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12 ft. long, sections, under copings, drainage plate embedded flashing including and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch- high, end dams. Solder corner profiles and provide lap joints 4-inch with butyl sealant for straight runs exceeding 8-foot lengths for stainless steel profiles. Provide butt joints with 6-inch wide concealed backers for aluminum profiles. Fabricate from the following materials:

- 1. Stainless Steel for embedded flashings and trim in masonry and where indicated to be stainless steel.
- 2. Aluminum: For exposed trim not embedded in masonry.

- B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Where trim profiles exceed 120 inches, provide butt joints with 6-inch wide concealed backers.

B-1. Fabricate from the following materials:

1-a. Aluminum.

- C. Trim in Exterior Ceilings and Soffits, Black: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12 ft. long installed adjacent to exterior wood ceilings and soffits. Provide butt joints with 6-inch wide concealed backer. Fabricate from the following materials:

- 1. Prefinished metallic-coated steel.

- D. Exterior, Sill and Base of Wall Flashings and Trim: Fabricate continuous flashings in continuous lengths required and a minimum 96-inch- long, but not exceeding 12 ft. long for lengths longer than 95 inches long.

- 1. Solder corner profiles and provide lap joints 4-inch with butyl sealant for straight runs exceeding 8-foot lengths for stainless steel profiles.
- 2. Provide butt joints with 6-inch wide concealed backers.
- 3. Fabricate from the following materials:

a. As indicated, from aluminum or stainless steel.

#### 2-62.8 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing, Roofing: Provided in Section 07 54 23.
- B. Overhead-Piping Safety Pans: Fabricate from the following materials:

1. Galvanized steel.

### PART 3 - EXECUTION (Not Used)

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrates, and other conditions affecting performance of the Work.
  1. Verify compliance with requirements for installation tolerances of substrates.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  3. Verify that air- or water-resistant barriers have been installed over substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION OF SHEET METAL FLASHING AND TRIM, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
  1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
  3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
  4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
  5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
  6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
  8. Do not field cut sheet metal flashing and trim by torch.
  9. 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 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.

1. Space movement joints at maximum of 10 ft. with no joints within 24 inches of corner or intersection.
  2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
  3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking not less than 1 inch for wood screws, that penetrate 3/4-inch for sheathing substrates, that penetrate metal framing and furring with not less than 1/4-inch or 3 full threads; and 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.
1. Use sealant-filled joints unless otherwise indicated.
    - a. Embed hooked flanges of joint members not less than 1 inch into sealant.
    - b. Form joints to completely conceal sealant.
    - c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
    - d. Adjust setting proportionately for installation at higher ambient temperatures.
    - 1) Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.
1. Pretin edges of sheets with solder to width of 1-1/2 inches; however, reduce pretinning where pretinned surface would show in completed Work.
  2. Do not solder prefinished steel and aluminum sheet.
  3. Do not use torches for soldering.
  4. Heat surfaces to receive solder, and flow solder into joint.
    - a. Fill joint completely.
    - b. Completely remove flux and spatter from exposed surfaces.
  5. Stainless Steel Soldering:
    - a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
    - b. Promptly remove acid-flux residue from metal after tinning and soldering.
    - c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
- H. Rivets: Rivet joints in aluminum and prefinished steel where necessary for strength, with color-matching rivet heads.

### 3.3 INSTALLATION LOW ROOF SHEET METAL FABRICATIONS

- A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Copings:

1. Install copings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.
  - a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
  - b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 16-inch centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

3.4 INSTALLATION OF WALL SHEET METAL FABRICATIONS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with 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. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.5 INSTALLATION OF MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing:
  1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
  2. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Overhead-Piping Safety Pans:
  1. Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings.
  2. Pipe and install drain line to plumbing waste or drainage system.

3.6 INSTALLATION TOLERANCES

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

3.7 CLEANING

- A. Clean and neutralize flux materials. Clean off excess solder.
- B. Clean off excess sealants.

3.8 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- C. Maintain sheet metal flashing and trim in clean condition during construction.
- D. 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, as determined by Architect.

END OF SECTION