

ARCHITECTURE

SECTION 07610

METAL ROOFING SYSTEMS

PART 1 GENERAL

1.1 SECTION REQUIREMENTS

- A. General: Standing Seam Copper Metal Roofing at Roof edges and decorative horizontal bands and where shown on drawings.
 - 1. Product is to match that of existing building in panel shape, profile and color.
- B. Mechanically Fastened System
- C. Underlayment to be Heat resistant "Ice and Water Shield" with 6" lap over entire area.
- D. Coordinate with exterior skin to form watertight membrane.

1.2 WARRANTY

- A. Submit warranty on the installing contractor's company letterhead agreeing to repair or replace sheet metal roofing, flashings and related work which leaks or otherwise fails to perform due to failure of workmanship for a period of two (2) years.
 - 1. Warranty includes leaking, failure or materials to stay in place, undue expansion, lifting, deformation, loosening and splitting of seams.
 - 2. Upon notification of defects within warranty period, make repairs at convenience of the Owner.
- B. Submit manufacturer's warranty on materials and finish for 20 years from date of Substantial completion.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Copper Sheet Stock: ANSI/ASTM B370; cold rolled copper sheet stock, H00 temper, unless otherwise indicated
 - 1. Weight (thickness): 16 oz./sq.ft. (0.55 mm), unless other wise indicated.
 - 2. Panel profile: Non-embossed, 1-1/2" high standing seams at 24" o.c. for lap seam with concealed fasteners.
 - 3. Non-Patinated Exposed Finish: Mill.

2.2 ACCESSORIES

- A. Form flashings from the same material and in the same finish as the standing seam roof.
- B. Provide fasteners that are color matched to the adjacent roof panels. Provide sealant and washer under any rivets or exposed fasteners.
- C. Self-Adhering High Temperature Sheet: 30 to 40 mils (0.76 to 1.0mm) thick minimum, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
 - 2. Low Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C), ASTM D 1970.

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2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete wall and roofing system and as recommended by primary sheet metal or portable roll-forming equipment manufacturer 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.
 - 1. General:
 - a. Exposed Fasteners: Heads matching color of sheet metal roofing using plastic caps or factory-applied coating.
 - b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - c. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Copper Sheet: Copper, hardware bronze, or Series 300 stainless steel.
- C. Solder:
 - 1. For Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal roofing and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.4 ACCESSORIES

- A. Sheet Metal Accessories: Provide components required for a complete sheet metal wall and roofing assembly including trim, copings, fasciae, corner units, clips, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items. Match material and finish of sheet metal roofing unless otherwise indicated.
 - 1. Provide accessories as recommended by portable roll-forming equipment manufacturer to produce sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance" Article.
 - 2. Cleats: For mechanically seaming into joints and formed from the following materials:
 - a. Copper Roofing: **16-oz./sq. ft. (0.55-mm)** copper sheet.
 - 3. Clips: Minimum **0.062-inch- (1.59-mm-)** thick, stainless-steel panel clips designed to withstand negative-load requirements.
 - 4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin foam or closed-cell laminated polyethylene; minimum **1-inch- (25-mm-)** thick, flexible-closure strips; cut or premolded to match sheet metal roofing profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
 - 5. Flashing and Trim: Formed from same material and finish as sheet metal roofing, minimum thickness matching the sheet metal roofing.

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2.5 FABRICATION

- A. General: Custom fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions (panel width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Fabricate sheet metal roofing and accessories at the shop to greatest extent possible.
 - 1. Standing-Seam Roofing: Form standing-seam panels with finished seam height of **1-1/2 inches (38 mm)**.
- B. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks; true to line and levels indicated; and with exposed edges folded back to form hems.
 - 1. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements shown on Drawings and as required for leakproof construction.
- C. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal roofing or manufacturers of the metals in contact.
- D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that tops of fasteners are flush with surface.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under sheet metal roofing. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire sheathing area, in shingle fashion to shed water, with end laps of not less than **6 inches (150 mm)** staggered **24 inches (600 mm)** between courses. Overlap side edges not less than **3-1/2 inches (90 mm)**. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement. Install fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by fabricator for sheet metal roofing.
 - 1. Field cutting of sheet metal roofing by torch is not permitted.
 - 2. Provide metal closures at rake edges rake walls.
 - 3. Flash and seal sheet metal roofing with closure strips at eaves, rakes, and perimeter of all openings. Fasten with self-tapping screws.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment. Pre-drill panels for fasteners.
 - 5. Install sealant tape where indicated.

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6. Lap metal flashing over sheet metal roofing to allow moisture to run over and off the material.
- B. Fasteners: Use fasteners of sizes that will penetrate wood sheathing not less than **1-1/4 inches (32 mm)** for nails and not less than **3/4 inch (19 mm)** for wood screws.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by SMACNA.
- D. 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.

3.4 CUSTOM-FABRICATED SHEET METAL ROOFING INSTALLATION

- A. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form a hem on concealed side of exposed edges unless otherwise indicated.
 1. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation.
 2. Fasten cleats not more than **12 inches (300 mm)** o.c. Bend tabs over fastener head.
- B. Seal joints as shown and as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- C. 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)**, except reduce pre-tinning where pre-tinned surface would show in completed Work.
 1. 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.
 2. Copper Roofing: Tin edges of uncoated copper sheets, using solder for copper.
- D. Standing-Seam Roofing: Attach standing-seam metal panels to substrate with cleats, double fastened at **12 inches (305 mm)** o.c. Install panels reaching from eave to ridge before moving to adjacent panels. Before panels are interlocked, apply continuous bead of sealant to top of flange of lower panel. Lock standing seams by folding over twice so cleat and panel edges are completely engaged.
 1. Lock each panel to panel below with sealed transverse seam.

3.5 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete sheet metal roofing assembly including trim, copings, seam covers, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items.
 2. Install accessories integral to sheet metal roofing that are specified in Division 7 Section "Sheet Metal Flashing and Trim" to comply with that Section's requirements.

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- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.6 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 sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions.

3.7 TOLERANCES

- A. Maximum offset from true alignment between adjacent members butting or In line: 1/16 inch.
- B. Maximum variation from plane or location indicated on drawings: 1/8 inch.

END OF SECTION