

SECTION 07 61 10
SHEET METAL ROOFING

PART I GENERAL

1.1 SUMMARY

A. Section includes:

1. On-site, roll-formed standing seam sheet metal roofing, felt, self-adhering polyethelyne-faced underlayment and accessories at the front porch and rear awning roof.

B. Related Sections:

1. Section 01 10 10 - Special Processes in Historic Preservation
2. Section 06 10 00 - Rough Carpentry
3. Section 07 60 00 - Sheet Metal Flashing and Trim
4. Section 07 71 40 - Gutters and Downspouts
5. Section 07 92 00 - Joint Sealers
6. Section 09 91 00 - Painting and Coatings

1.2 REFERENCES

- A. ASTM B101 - Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
- B. ASTM D226 - Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. ASTM D2178 - Specification for Asphalt Glass (Felt) Used in Roofing and Waterproofing
- D. ASTM D4586 - Specification for Asphalt Roof Cement, Asbestos Free.
- E. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- F. CDA (Copper Development Association) - Copper in Architecture Handbook.

- G. SMACNA (Sheet Metal and Air Conditioning Contractors National Association) - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on metal types, finishes, profiles and characteristics.
- C. Qualifications: Submit documentation which verifies qualifications of roofing contractor subcontractor, their site supervisors and craftsmen per part 1.5 of this section.
- D. Samples: Submit the number of samples the Contractor needs returned, plus two additional samples which will be retained by the Architect. Samples are to be 8 x 8 inch in size illustrating metal thickness and finish color.
- E. Shop Drawings: Show fabrication and installation layouts of sheet metal roofing, including plans, elevations, and keyed references to termination points. Distinguish between shop and field-assembled work. Include the following if any of this is to be different than, or in addition to details on the Construction Documents.
 - 1. Details for forming sheet metal roofing, including seams and dimensions.
 - 2. Details for joining and securing sheet metal roofing, including layout of fasteners, clips and other attachments. Include pattern of seams.
 - 3. Details of termination points and assemblies, including fixed points.
 - 4. Details of expansion joints, including showing direction of expansion and contraction.
 - 5. Details of roof penetrations.
 - 6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter flashings.
 - 7. Details of special conditions

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. Copper Roofing Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Building mockup of typical roof eave, including fascia, and apron as shown on Drawings: approximately 48 inches square. Provide ridge and standing seams

1.5 QUALIFICATIONS

Fabricator and Installer: Company and designated personnel specializing in sheet metal roof installations with minimum seven years documented experience. Refer to submittal requirements.

1.6 PRE-INSTALLATION MEETING

- A. Section 01300 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- C. Section 01600 - Product Requirements: Product storage and handling requirements.
- D. Deliver sheet metal roofing pans, components, and all other sheet metal roofing materials so as to not be damaged or deformed. Package sheet metal roofing materials for protection during any transportation or handling.

- E. Unload, store and erect sheet metal roofing materials in a manner to prevent bending, warping, twisting and surface damage.
- F. Stack materials on platforms or pallets, covered with suitable weather tight and ventilated covers. Store metal coils and sheet metal roofing materials to ensure dryness. Do not store metal coils or sheet metal roofing materials in contact with other materials that may cause staining, denting or other surface damage.
- G. Store copper away from uncured concrete and masonry.

1.8 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate installation of the substrate work so that substrate is completely ready when roofing begins.
- C. Coordinate sheet metal roofing with rain drainage work, flashing, trim, and construction of new wood deck assemblies, walls and other adjoining work to provide a leak proof, secure and non-corrosive installation

1.9 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Provide five year manufacturer warranty for custom sheet metal roofing.
 - 1. Failures to include, but are not limited to the following:
 - a) Structural failures of the materials supplied
 - b) Loose parts
 - c) Excessive oil canning
 - d) Failure to remain weather tight, including uncontrolled water leakage

- e) Deterioration of metals, metal finishes, and other materials beyond normal weathering, including non-uniformity of color or finish
- f) Galvanic action between sheet metal roofing and dissimilar materials.

PART 2 PRODUCTS

2.1 ROOFING SHEET METALS

- A. Lead Coated Copper Sheet: ASTM B 101, consisting of cold-rolled copper sheet, H00 temper, 16 oz/sq ft., coated both sides with lead weighing not less than 12 lb/100 sq. ft. nor more than 15 lb/100 sq ft.

- 1. Available Manufacturers:

- a) Hussey Copper Ltd.
- b) Outokumpu American Brass
- c) Revere Copper Products Inc.
- d) Follansbee Company

2.2 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts.
- B. Self-Adhering, Polyethylene-faced Sheet: ASTM D 1970, 40 mils thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.

- 1. Available Products:

- a) Carlisle Coatings and Waterproofing, Dri-Start A
- b) W.R. Grace & Co. Ice and Water Shield
- c) Johns Manville, Roof Defender
- d) Owens Corning, Weatherlock
- e) Polyguard Products, Deck Guard

- C. Slip Sheet: Building paper, minimum 5 lb./100 sq. ft, rosin sized.

2.3 ACCESSORIES AND MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, separators, sealants and other items as required for a complete and total roofing system and as may be recommended by fabricator for sheet metal roofing. Provide components as required for a complete sheet metal roofing assembly, including drip edges, corner units, ridge closures, clips, flashings, required sealants, gaskets, fillers, closure strips and similar items.
- B. Wood Expansion Joint Material and Curbs: Lumber complying with the requirements of Specification 06100: Rough Carpentry.
- C. Reglets: Recessed type, fitted into existing brick masonry joints.
- D. Fasteners: Copper, self-tapping screws, self-locking rivets and bolts and other suitable and/or approved mechanical fasteners designed to withstand anticipated loads.
 - 1. Nails for Copper Roofing: Copper, stainless steel or hardware bronze, 0.109 inch minimum and not less than 7/8 inch long, barbed with large head.
 - 2. Rivets: 100% copper pop-rivets.
 - 3. Cleats: Mechanically seamed cleats formed from 20-oz/sq.ft. thick copper sheet.
- E. Solder for Lead-Coated Copper: ASTM B 32, type suitable for application and material being soldered.
- F. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use the stated classifications required to produce joints in sheet metal roofing that will remain weather tight and as recommended by roll-formed sheet metal roofing manufacturer for installation indicated.

- G. Expansion-Joint Sealant: For hooked-type expansion joints, which must be free to move, provide non-setting, non-hardening, non-migrating, heavy-bodied polyisobutylene sealant.
- H. Plastic Cement: ASTM D4586, Type 1.
- I. Bituminous Roofing Paint: Cutback type conforming to MIL-C-450 or FS TT-C-494.
- J. Flashing and Trim: See Section 07 60 00: Sheet Metal Flashing and Trim.
- K. Gutters and Downspouts: See Section 07 71 40 Gutters and Downspouts.

2.4 FABRICATION

- A. General: Contractor to custom fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, geometry, metal thickness, and other characteristics of installation indicated. All work to comply with manufacturer's written instructions.
- B. Form standing-seam pans with finished height of 1 inch.
- C. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- D. Fabricate cleats of same material as sheet, interlockable with sheet.
- E. Fabricate starter strips of same material as sheet, continuous, interlockable with sheet.
- F. Form pieces in single length sheets.
- G. Hem exposed edges on underside ½ inch; miter and seam corners.
- H. Fabricate sheet metal roofing to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the

Work. 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. Lay out sheet metal roofing so cross seams, when required, are made in direction of flow with higher pans overlapping lower pans. Stagger cross seams.
 2. Fold and cleat eaves and transverse seams in the shop.
 3. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral sections of flashings, and other components of metal roofing profiles, patterns, and drainage arrangements shown and as required for leak proof construction.
- I. Tin edges of copper sheet to be soldered. Solder shop formed metal joints. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal joints.
- J. Fabricate corners from one piece with minimum 18 inch long legs; solder for rigidity.
- K. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- L. Sealant Joints: Where moveable, non-expansion-type joints are indicated or required to produce weather tight seams, form metal to provide for proper installation of elastomeric sealant, joints in compliance with SMACNA standards.
- L. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying required rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturers of dissimilar metals or by fabricator.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for the recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces will be acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Examine substrates, areas and conditions, with Installer present, for compliance with the stated requirements for installation tolerances, sheet metal roofing supports, and other conditions that may be affecting performance of work.
 - 1. Examine the roof deck to verify it is clean and smooth, that sheathing joints are supported by framing or blocking, and that decking is free of depressions, waves or projections, and properly sloped to eaves
 - 2. Examine primary and secondary roof framing members to verify that rafters, purlins, angles, channels and other structural support members and anchorages have been installed.
 - 3. Verify that the substrate is sound, dry, smooth, clean and that provision has been made for flashings and penetrations through the sheet metal roofing.
 - 4. For the record, prepare a written report, endorsed by Installer, listing conditions detrimental to performance of work.

3.2 PREPARATION

- A. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection.
- B. Broom clean deck surfaces under underlayment.
- C. Install starter and edge strips, and cleats before starting installation.
- D. Install reglets as detailed. Seal top of reglets with sealant.
- E. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Underlayment
 - 1. Apply self-adhering polyethylene-faced layer, wrinkle-free, over entire roof area in single layer laid perpendicular to slope; weather lap edges 2 inches. Comply with temperature restrictions of the specified underlayment by manufacturer for installation. Install at locations indicated on Drawings, in shingle fashion to shed water. Comply with manufacturer's installation instructions. Install with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller.
 - 2. Apply felt over self-adhering polyethylene-faced layer to limit adhesion to metal roof.
 - 3. Apply slip sheet in one layer, laid loose before installing sheet metal roof.
- B. General Roofing Installation Requirements:
 - 1. Cleat and seam all joints.

2. Use adhesive for temporary anchorage, where possible, to minimize the use of mechanical fasteners under sheet metal roofing.
 3. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.
 4. Provide formed metal pans for protrusions through roof. Fill pans watertight with plastic cement.
 5. Solder lap intersection joints. After soldering, wash metal clean with neutralizing solution, rinse with water.
- C. Standing Seam Roofing Installation: Conform to SMACNA details and assembly standards.
- D. Flashing Installation: Coordinate with Section 07 60 00 - Sheet Metal Flashing and Trim.
- E. CLEANING AND PROTECTION OF INSTALLED CONSTRUCTION
1. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
 2. Replace panels that have been damaged beyond successful repair and/or as determined by Owner and Architect.
 3. Do not permit traffic over unprotected roof surface.

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