

## SECTION 07612

### SHEET COPPER ROOFING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Flat-seam copper roofing.
- B. Standing-seam copper roofing.
- C. Batten-seam copper roofing.
- D. Horizontal-seam (Bermuda type) copper roofing.
- E. Custom-designed copper roofing.

##### 1.2 RELATED SECTIONS

- A. Section 05120 - Structural Steel: Roof framing.
- B. Section 06100 - Rough Carpentry: Wood framing and decking.
- C. Section 07200 - Thermal Insulation: Roof insulation.
- D. Section 07622 - Copper Flashing and Trim: Flashing and other trim not part of roofing.
- E. Section 07712 - Copper Roof Specialties: Accessories on roof other than mechanical and structural items.
- F. Section 07900 - Joint Sealers: Field-applied panel sealants.
- G. Section 09900 - Paints and Coatings: Copper roofing finishes.

##### 1.3 REFERENCES

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. ASTM B 32 - Standard Specification for Solder Metal.
- C. ASTM B 101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction.

- D. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
- E. UL 580 - Tests for Uplift Resistance of Roof Assemblies.
- F. CDA 4115-1929 - Copper in Architecture Handbook; Copper Development Association.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Design roof assembly to conform to the requirements of ASCE 7, Minimum Design Loads for Buildings.

#### 1.5 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Product Data: Submit metal manufacturer's and fabricator's specifications, installation instructions, and general recommendations for roofing applications.
- C. Samples: 6 inch square specimens of specified copper roofing material.
- D. Shop Drawings: Show manner of forming, joining, and securing copper roofing, and pattern of seams. Show expansion joint details and waterproof connections to adjoining work and at obstructions and penetrations.

#### 1.6 QUALITY ASSURANCE

- A. Installer: A firm with 3 years of successful experience with installation of copper roofing of type and scope equivalent to project requirements.
- B. Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of CDA 4115-1929, "Copper in Architecture Handbook" by Copper Development Association (CDA). Conform to dimensions and profiles indicated.
- C. Wind Uplift: Provide roof assemblies meeting requirements of UL 580 for Class 90 wind uplift resistance.
- D. Mock-Up: Before proceeding with final purchase of materials and fabrication of copper roofing components, prepare a mock-up of work in location indicated on Drawings. Incorporate materials and methods of fabrication and installation identical with project requirements. Retain accepted mock-up as quality standard for acceptance of completed copper roofing. If

accepted, mock-up may be incorporated as part of copper roofing work.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store copper sheet and coil products, both uncoated and lead-coated, in dry location and in a manner so as to preclude the formation of condensation on copper surfaces.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Provide products manufactured by one of the following:
  - 1. Revere Copper Products, Inc.
  - 2. Hussey Copper, Ltd.
  - 3. Outokumpu American Brass Company.

### 2.2 MATERIALS

- A. Copper Roofing Sheets: Cold-rolled copper sheet complying with ASTM B 370 temper designation, H00, unless otherwise indicated, and as follows:
  - 1. Weight: 16 oz. per sq. ft. unless otherwise indicated.
  - 2. Weight: 20 oz. per sq. ft. unless otherwise indicated.
- B. Batten Caps: 20 oz. per sq. ft. copper unless otherwise indicated.
- C. Lead-Coated Copper Roofing Sheets: Lead-coated copper sheet complying with ASTM B 101, temper designation H00, consisting of cold-rolled copper sheet coated both sides with lead weighing not less than 12 lbs. nor more than 15 lbs. per 100 sq. ft. of copper sheet (one half of total weight of lead applied each side), and as follows:
  - 1. Weight of Coated Sheet: Not less than 17.1 oz. per sq. ft. (nominal weight of bare copper sheet, 16 oz.), unless otherwise indicated.
  - 2. Weight of Coated Sheet: Not less than 21.2 oz. per sq. ft. (nominal weight of uncoated copper sheet, 20 oz. per sq. ft.) unless otherwise indicated.
- D. Batten Caps: 21.2 oz. per sq. ft. lead-coated copper unless otherwise indicated.
- E. Miscellaneous Materials: Provide materials and types of fasteners, solder, welding rods, protective coatings,

- separators, sealants and accessory items as recommended by copper sheet manufacturer and fabricator for copper roofing work, except as otherwise indicated.
- F. Expansion Joint Sealant: For hooked-type expansion joints, which must be free to move, provide nonsetting, nonhardening, nonmigrating, heavy-bodied polyisobutylene mastic sealant.
  - G. Paper Slip Sheet: Minimum 4-lb. rosin-sized building paper.
  - H. Accessories: Except as indicated as work of another specification section, provide components required for a complete roof system, including trim, copings, fascias, ridge closures, clips, seam covers, battens, flashings, gutters, louvers, sealants, gaskets, and closure strips. Match materials and finishes of roof.
    - 1. Sealing Tape: Pressure-sensitive 100 percent solids polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
    - 2. Joint Sealant: One-part elastomeric polyurethane, polysulfide, butyl, or silicone rubber sealant as recommended by the building manufacturer.
  - I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat, except as otherwise indicated. Provide inert-type noncorrosive compound, nominally free of sulfur components and other deleterious impurities.
  - J. Roofing Felt: Asphalt or coal tar saturated felt weighing not less than 30 lbs per 100 square feet.
  - K. Fabric Underlayment: Manufacturer's standard nonwoven polyester fabric marketed for use in cold-applied single ply roof systems, weighing 6.0 oz. per sq. yd., white, nonswelling, rot and mildew resistant.
    - 1. Product: E-6-N Rufon Fabric; Phillips Fibers Corp.
  - L. Batten Bars and Strips: If size is not indicated, provide battens of nominal 2 inch by 2 inch size (1-1/2 inch by 1-1/2 inch minimum).
    - 1. Copper Batten Bars: 20-ounce cold-rolled copper.
    - 2. Wood Batten Strips: Fabricated to size indicated from lumber complying with requirements of Section 06100 - Rough Carpentry and preservative treated by pressure process using a chemical solution that is nonhygroscopic and noncorrosive to type of copper roofing.

- M. Nails: Copper or hardware bronze, 0.109 inch minimum not less than 7/8 inch long barbed with large head.
- N. Screws and Bolts: Bronze, brass, or stainless steel.
- O. Cleats: 16 ounce cold rolled copper; 2 inches wide x 3 inches long.
- P. Solder: ASTM Specification B 32, Composition 50/50 tin/lead; 60/40 tin/lead for lead-coated copper.
- Q. Flux: Muriatic acid neutralized with zinc or approved brand of soldering flux.

### 2.3 SHOP-FABRICATED UNITS

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of CDA "Copper in Architecture Handbook" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrate. Comply with material manufacturer's instructions and recommendations for forming material. Form exposed copper work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in copper sheet with flat-lock seams. Tin edges to be seamed, form seams, and solder. Rivet joints for additional strength where indicated.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, non-expansion-type joints are indicated or required for proper performance of work, form copper to provide for proper installation of elastomeric sealant, in compliance with CDA standards.

- E. Separations: Provide for separation of copper from noncompatible metal or corrosive substrate by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

## PART 3 EXECUTION

### 3.1 COORDINATION

- A. Coordinate copper roofing with rain drainage work, flashing, trim and construction of decks, parapets, walls, and other adjoining work to provide a permanently leakproof, secure, and noncorrosive installation.

### 3.2 PREPARATION

- A. Clean surfaces to receive copper roofing. Substrate to be smooth and free of defects. Drive all projecting nails or other fasteners flush with substrate.

### 3.3 INSTALLATION

- A. Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of copper being fabricated and installed.
- B. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.
- C. Install underlayment and paper slip sheet on substrate under copper roofing to greatest extent possible unless otherwise recommended by manufacturer of sheet metal. Paper slip sheets must be installed over the underlayment. Use adhesive for temporary anchorage, where possible, to minimize use of mechanical fasteners under copper roofing. Lap joints 2 inches minimum.
- D. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings and other components of copper roofing to profiles, patterns and drainage arrangements shown and as required for permanently leakproof construction. Provide for thermal expansion and contraction of the work, as indicated.

Seal joints as shown and as required for leakproof construction. Shop-fabricate materials to greatest extent possible.

- E. Sealant-Type Joints: Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 in. into sealant. Form joints to conceal sealant completely. When ambient temperature is moderate at time of installation, 40 degrees to 70 degrees F (4 degrees to 21 degrees C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 degrees F (4 degrees C). Comply with requirements of Section 07900 for handling and installing sealants.
- F. 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. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.
- G. Conceal fasteners and expansion provisions where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- H. Tin uncoated copper surfaces at edges of sheets to be soldered, for a width of 1-1/2 inches, using solder recommended for copper work. Where surfaces to be soldered are lead-coated, do not tin the edges, but wire brush lead coating before soldering.

#### 3.4 CLEANING

- A. Remove protective film (if any) from exposed surfaces of copper roofing promptly upon installation. Strip with care to avoid damage to finishes.
- B. Clean exposed metal surfaces of substances that would interfere with uniform oxidation and weathering.

#### 3.5 FINISHING

- A. To retard natural weathering, apply a uniform coating of high grade paraffin oil or a clear lacquer coating.

### 3.6 PROTECTION

- A. Provide final protection in a manner acceptable to installer that ensures that copper roofing is without damage or deterioration at time of Substantial Completion.

END OF SECTION