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Standing Seam Roof Panel Specifications

SECTION 07610 – PREFORMED COPPER ROOFING

PART 1 – GENERAL

1.1 Section Includes:

- A. Copper Roof Panel System

1.2 Related Sections:

- A. Metal roof decking
- B. Plywood roof decking
- C. Preformed metal wall systems
- D. Sealants

1.2 References:

- A. Document ASCE 7-95. For determining wind speed
- B. ASTM E-1592. Test method for wind uplift for roofing.
- C. ASTM B32 – Solder
- D. ASTM B370 – Copper Sheet and Strip for Building Construction.
- E. ASTM D226 – Asphalt Saturated Roofing Felt.
- F. ASTM E283 – Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
- G. ASTM E330 – Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Pressure Difference.
- H. FS FFS-325 – Shield Expansion; Nail, expansion and Nail, drive screw.
- I. SMACNA – Architectural Sheet Metal Manual, Fifth Edition, 1993.
- J. Copper Development Association – Copper in Architecture.
- K. Revere Copper Products, Inc. – Copper and Common Sense.

1.3 Submittals:

- A. Provide certification by manufacturer that design and details of copper roof system meet manufacturers requirements.
- B. Shop Drawings: Submit in accordance with Section 01340. Include the following details and information:
 - 1. Elevations and plan view, with keyed reference to termination points.
 - 2. Details of termination points and assemblies.
 - 3. Indicate where fixed point of roofing sheet occurs and how cleats and clips will handle expansion and contraction of materials.

4. Expansion and contraction direction of roof.
 5. Penetrations through roof panels.
 6. Seam and panel dimensions.
 7. Eave, ridge, valley, rake, cricket and counterflashing.
 8. Interfaces of metal roofing material to adjoining materials.
 9. Show transverse seam patterns and locations.
 10. Sufficient technical data to demonstrate compliance with the specific requirements.
 11. Fastener, clip and attachment layout, with load carrying capacity to meet these specifications and pullout data on fastener into the designed substrate.
- C. Samples: Submit 2 of the following:
1. 12 x 12 inch sample of sheet material with finish.
- D. Quality Control Submittals:
1. Experience Record: Applicator's list of similar projects completed with name of project, owner and Architect.
 2. Design Calculations: Evidencing uplift resistance of roof system. Calculations shall include Engineer's review confirming compliance with wind uplift requirements. Calculations to be stamped by a Registered Engineer.
 3. Submit mill certification that copper is 99.9% pure top grade material and meets specifications.

1.5 **Quality Assurance:**

- A. Applicator: Minimum of 5 years experience in application of similar types of copper roofing.
- B. Design Criteria:
1. Provisions of Thermal Movement: Fabricate and install metal roofing systems to provide for expansion and contraction of component materials without buckling, hole elongation, fastener failure or excess stress loading situations developing at any time during temperature cycle. Allowance shall be set for ambient temperature at time of installation. Design and install clips to resist rotation and to avoid shear stress when roofing material expands and contracts.
 2. Uplift Resistance: Fabricate and install copper roofing system to resist design negative pressure of (90 lbs.). Clips, fasteners and clip spacing shall correspond to required design negative pressure with a minimum factor of safety of 3.
 3. Performance of the system shall be determined through use of ASTM E-1592 Test Method for Wind Uplift for Roofing.
 4. Water infiltration: Fabricate and install metal roof system so as not to allow any infiltration of water. Laps of metal flashing and connections of roof panels shall be installed to allow moisture to run over and off material.

1.6 Protection:

- A. Provide owner with a written warranty which shall warrant sheet metal roofing to be free of leaks and defects in materials and workmanship for a period of one year from date of substantial completion.
- B. Provide 30 year material warranty on copper.

PART 2 – PRODUCTS

2.1 Manufacturer:

- A. Provide Copper Architectural 5 ply double lock (DL-5) standing seam roof panel system as manufactured by CopperCraft, Inc. (PH 800-486-2723), or roofing systems providing equal materials, performance, appearance, and guarantees. Roofing system shall be tested and certified by Underwriters Laboratories, Inc. for Class 90 wind uplift.

2.2 Materials:

- A. Copper Roof Panels: 99.9% pure copper, CDA 110, ASTM B370 cold rolled temper, weighing not less than (16 oz., 20 oz.) per square foot. Panels to be rollformed in continuous lengths to the greatest extent possible to handle expansion and minimize transverse seams. Standing seams to be 1” high double lock seams (12”-21”) on centers.
- B. Sheet copper for related flashings, edge strips and cladding shall be minimum (16 oz., 20 oz.) cold rolled, CDA 110, copper conforming to ASTM Standard B370.
- C. Concealed Cleats: 16 oz. copper or .018 stainless steel, fixed or expansion type, as required. Cleats shall be designed to prevent hook unwind.
- D. Fasteners: All fasteners in contact with copper shall be copper, brass or series 300 stainless steel. (Fasteners for concealed cleats to be stainless steel screws – nails are not acceptable.)
- E. Solder: ASTM B32, composition 50% pig lead and 50% block tin.
- F. Flux: Rosin, muriatic acid neutralized with zinc, or an approved soldering paste.
- G. Underlayment: Asphalt saturated, unperforated roofing felt, ASTM D266, 30 lb. type, laid horizontally and lapped a minimum of 4”.
- H. Slip Sheet: Rosin sized building paper, weighing approximately 4 lbs. per 100 square feet, minimum.
- I. Sealant: ASTM C920, one component silicone based material, movement capability of +/- 50%. Color as selected by Architect.
- J. Protective Coatings:
 - 1. Alkyd type Zinc Chromate: FS TTP641, Type II
 - 2. Bituminous Coating Compound: FS TTC494, Type II

2.3 Fabrication:

- A. Panels:

1. Factory formed panels. Width of (12 – 21) inches with seams formed to receive field seaming to double lock profile. (Provide factory tapered and/or factory curved panels as required.)
2. Fabricate panels to longest lengths practical, not to exceed 35 feet.
3. Fabricate panels to use concealed fasteners. Exposed fasteners in roofing panels are prohibited.

PART 3 – EXECUTION

3.1 **Examination:**

- A. Examine roof deck for conditions that would prevent proper application of roofing. Immediately notify Contractor of defects, and do not proceed with roofing operation until defects are corrected.
- B. Verify that surfaces to receive roofing are smooth, sound, clean and dry.
- C. Before fabricating sheet metal, field verify shapes and dimensions of surfaces to be covered.

3.2 **Workmanship:**

- A. Form to shapes and dimensions shown, free from defects which impair strength or mar appearance.
- B. Form planes and lines to true alignment.

3.3 **Installation:**

- A. General:
 1. Install metal roofing using skilled workman, in strict accordance with manufacturers recommendations and approved shop drawings. Details shown on drawings shall be considered typical and apply for similar features where not particularly detailed.
 2. Incorporate adequate and approved provision in the work to compensate for thermal expansion and contraction.
- B. Underlayment:
 1. Secure to roof deck with minimum anchorage.
 2. Lap joints 4” minimum, beginning at bottom of roof so that felt overlaps in direction of waterflow.
- C. Slip sheets:
 1. Install over underlayment and secure with copper nails. Take care to insure that slip sheet completely isolates the underlayment from the copper.
 2. Lap joints 2 inches minimum.
 3. Remove and replace wet rosin paper.
- D. Roof panels:
 1. Install over slip sheets using cleats at 18” on centers, minimum or as required by approved engineer tests.
 2. Stagger transverse seams in adjacent panels.

3. Flash roof penetrations with material matching roof panels and make watertight by soldering.

E. Seams:

1. Mechanically seam to 5 ply double lock, finished 1" high.
2. Transverse seams:
 - a. Four-ply common lock with capillary breaks, two inch width, minimum.
 - b. Low pitch: (Less than 6 in 12, but more than 3 in 12). Fold top edge of lower panels over ". Solder 1 " wide continuous locking strip parallel to and 4" below top edge. Fold bottom edge of upper panel under " and engage locking strip.
3. Ridge treatment: Interlocked standing seams or ridge cap.

F. Soldering:

1. Clean and flux material prior to soldering.
2. Perform soldering slowly with well heated coppers and thoroughly heat the seam and sweat the solder through its full width.

3.4 **Cleaning:**

- A. As work progresses, neutralize excess flux with 5% to 10% washing soda solution and thoroughly rinse.
- B. Leave work clean, and free of stains, scrap and debris.