

SECTION 07610 – SHEET METAL ROOFING

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

- A. The Work of this Section shall include, but not be limited to, the following:
 - 1. Custom fabricated, mechanically attached, *pre-weathered* zinc alloy double lock standing seam roof panels as indicated on the Drawings, with all required accessories for a weatherproof installation.
 - 2. Zinc gutters and downspouts as indicated on the Drawings.
 - 3. Snow Guards as indicated on the drawings.
- B. Related Sections:
 - 1. Section 05400 – Lightgauge Metal Framing
 - 2. Section 06100 – Rough Carpentry
 - 3. Section 07210 – Building Insulation
 - 4. Section 07530 – Elastomeric Sheet Roofing
 - 5. Section 07620 – Sheet Metal Flashing and Trim
 - 6. Section 07920 – Joint Sealants

1.3 REFERENCES

- A. Rheinzink Application in Architecture, 2nd Updated Edition, January 2002
- B. SMACNA – Architectural Sheet Metal Manual; 5th Edition; Chapter 6 as a minimum standard or these specification and details where they exceed.
- C. Names of the applicable building codes or other authorities having jurisdiction:
- D. As all documents are intended to be complementary, in the event of contradiction in the references, the RHEINZINK January 2002 reference will govern.

1.4 SUBMITTALS

- A. Provide product data for zinc wall panels and zinc metal roofing including manufacturer's product specifications, standard details, installation instructions, and general recommendations,
- B. Verification Samples: submit representative plywood-mounted samples of each material that is to be exposed in the finished work, showing horizontal and vertical seams at abutting panels, attachment methods, colors, and finish variations. Provide samples having minimum size of 24" square.
- C. Shop Drawings: show layouts of panels on all wall elevations and roof plans, details of edge conditions, joints, corners, panel profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory and field assembly work. Details shall be drawn full scale.
 - 1. Details for forming sheet metal components, including seams and dimensions.
 - 2. Details for joining and securing sheet metal components, including layout, number of required fasteners, clips and other attachments. Include pattern of seams and spacing of clips.
 - 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 wall penetrations such as doors, windows, and louvers.
 - 7. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets and counter flashings.
 - 8. Details of special conditions, integrating mechanical, electrical and plumbing conditions.
 - 9. Details of connections to adjoining work
 - 10. Details of the following accessory items, at a scale of not less than 1 ½ inches per 12 inches:
 - a. Flashing and Trim
 - b. Gutters
 - c. Snow Guards
 - d. Roof Access Steps
 - e. Safety Line Attachments
- D. Calculations: Provide positive and negative wind load pressure calculations and certification of the performance of this work prepared and sealed by a locally licensed Professional Structural Engineer Registered. Show how design load requirements and other performance criteria have been satisfied.
- E. Certification from the fabricator and installer, certifying that the installed systems meet the specified performance requirements and those of authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: The fabricator and installer of the material or equipment described in this Section must, within the last five consecutive years, have successfully completed in a timely fashion at least ten projects similar in scope and type to the required work for this Section.
- B. Source: Provide panels which are the product of one manufacturer. Provide secondary materials which are acceptable to the zinc manufacturer. Award installation of zinc wall and or roof panels, including underlayment and membrane to a single firm for undivided responsibility.
- C. Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the RHEINZINK Applications in Architecture Manual. Conform to dimensions and profiles shown.
- D. Field Measurements: Prior to fabrication of panel systems, take field measurements of structure or substrates to receive panel systems.
- E. Pre-Installation Conference: Prior to commencement of work, convene an installation conference to include the Architect, General Contractor and Zinc Panel Installer in order to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
 - 1. Review methods and procedures for installation including, but not limited to: substrates, drains, curbs, penetrations and other preparatory work
 - 2. Review drawings, specifications and other contract documents
 - 3. Review submittals
 - 4. Review construction schedule verifying availability of all materials, personnel and equipment needed to proceed and avoid delays
 - 5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including temporary roofing.
- F. Mock-Up: Mock-up of exterior standing seam metal panels as required by architect. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mock-up at roof or façade area location directed by Architect. Retain accepted mock-up as quality standard for acceptance of completed metal roofing. If accepted, mock-up may be incorporated as part of metal [roofing or wall] work.
 - 1. Provide mock-up of sufficient size and scope to show typical pattern of standing seams, panel width, edge construction, a sample of soldering (where required) and finish texture and color.
 - 2. Provide mock-up of gutter and eave assembly
 - 3. Extent of mock-ups is indicated on the Drawings
 - 4. Obtain Architect's written approval of mock-ups prior to proceeding with installation of mock-up.
- G. Soldering: In accordance with manufacturer's instructions.

- H. Corrosion Control: Avoid direct contact of incompatible materials.

1.6 PERFORMANCE REQUIREMENTS

- A. Design roof assembly to conform to the requirements of the IBC 2003 Building Code.
- B. Install sheet metal roofing capable of withstanding exposure to weather without failure or infiltration of water into the building interior.
- C. Wind Load: Design and engineer sheet metal roof and wall assemblies, including size and spacing of attachment devices, meeting requirements of local building codes.
- D. Thermal Movement: Provide systems and connections which allow for thermal movement resulting from ambient temperature range of 120 ° F.
- E. Structural Performance: Provide metal panels, anchors and attachments which resist loads required by code and loads as indicated on the Structural Drawings without permanent deflection or permanent deformation. Information on Drawings referring to specific design of attachment, panel stiffening, and structural systems is intended for information only. System performance, based on project conditions and compliance with all applicable codes and loading requirements, shall be the responsibility of the panel fabricator and installer.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened factory labeled packages. Protect from all possible damage. All zinc to be transported according to manufacturer's recommendations.
- B. Store and handle in strict compliance with manufacturer's instructions and recommendations.
 - 1. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather tight ventilated covering. Slope cover to shed moisture. Allow for free air flow around covered material to exchange outside air.
 - 2. Require all personnel to wear clean white cotton gloves when handling and installing zinc panels and accessories.
 - 3. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
 - 4. Store metal wall and roof panels so that they will not accumulate water.
- C. Exercise care in unloading, storing, and erecting panels to prevent bending, warping, or surface damage.
- D. Sequence deliveries to avoid delays, but minimize on-site storage.
- E. Do not permit unnecessary walking on finished roof. Require all personnel to wear uncontaminated, clean, rubber-soled shoes when installing or walking on finished roof.

1.8 WARRANTY

- A. Submit 2-part, 5-year, written, signed and sealed warranty:
 - 1. By the zinc manufacturer for zinc material defects
 - 2. By the manufacturers of other components of the wall or roof assembly for their material defects.
 - 3. By the installer agreeing to repair or replace systems or components as a result of workmanship defects.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering metal roof or wall panel materials that may be incorporated in the work include:
 - 1. Rheinzink America, Inc.
- B. Zinc Alloy Sheet/Coils:
 - 1. Titanium Zinc Alloy whose base is electrolytic high grade fine zinc (DIN EN1179) with a 99.995 % Zn degree of purity and alloying additives of 1% copper and 1% titanium in accordance with DIN EN 988.
 - a. Bright and Shiny
 - b. Pre-Weathered: pickling process (no phosphating)
 - 2. Blue-Gray
 - 3. Graphite Gray
 - a. Pre-Weathered Pro-Roofing: backside coated with elastomeric finish as manufactured by PPG Industries
 - 4. Minimum Panel Thickness: 0.8 mm
 - 5. Minimum Flashing Thickness: 0.7 mm
 - 6. Provide custom copings and related sheet metal work fabricated from zinc, copper and titanium alloy sheet by Rheinzink America, Inc.
 - 7. Provide custom sheet metal fascia at all Elastomeric roof edge conditions as fabricated from zinc, copper, titanium alloy sheet by Rheinzink America, Inc.

2.2 FRAMING

- A. Design, engineer, and provide complete assembly of framing components, studs, girts and the like. All framing members and components shall be fabricated from ASTM A525 G90 galvanized sheet steel. Provide all primary and secondary framing members not indicated on the structural drawings.

- B. Coordinate panel support with cold-formed metal framing, plywood sheathing, exterior gypsum sheathing and furring, for complete structural support for performances indicated. Refer to Section for related requirements.

2.3 ACCESSORIES

- A. Provide all components necessary for a complete, functional, weatherproof assembly including, but not limited to, trims, copings, fascias, sills, flashings, counter flashings, door frame trim, corner units, clips, wall caps, copings, sealants, closures and fillers. Metal materials shall match panels and be zinc compatible.
- B. Clips & Fasteners: Provide stainless steel or zinc, corrosion free; supplied in accordance with manufacturer's recommendations and to meet the load requirements as specified by Engineer and maintain a weather-tight installation. For slopes less than 2:12 and when backside coated materials is specified, use only stainless steel clips and fasteners. Attachment clips shall permit expansion and contraction of the panel system throughout the specified temperature range. Provide fasteners with watertight washer gaskets.
- C. Solder: Lead-tin solder containing 40% tin and 60% lead to DIN 1707 termed L-Pb Sn 40 (Sb) [antimony content less than 0.5 wt.%]. Flux: Felder ZD-Pro or equal.
- D. Non-Permeable Underlayment and Ice Dam Protection: self-adhering, high-temperature composite, butyl rubber-based, polyethylene-backed membrane such as Vycor Ultra as manufactured by Grace Construction Products.
- E. Sealants:
 - 1. Seam Sealing Tape: pressure-sensitive 100 per cent solids polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, non-sag, non-toxic non-staining tape.
 - 2. Joint Sealant: DOW 795; backer rod shall be extruded polyethylene foam as DOW ETHAFOAM SB or equal.
- F. Snow Guards: stainless steel, snow retention system equal to
 - 1. Rees Rheinzink.
 - 2. Heule
 - 3. S-5! ColorGard
 - 4. Other Manufacturer

2.4 PANEL FABRICATION

- A. General: Custom fabricated sheet metal roofing panels to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" and RHEINZINK's "Applications in Architecture" that apply to the design, dimensions (pan width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Shop fabricate sheet metal roofing panels and accessories to greatest extent possible.
 - 1. Standing-Seam Roofing and wall Panels: Form standing-seam pans from continuous metal sheets, with double locked standing seam pans with a finished seam height of 1 inch unless otherwise noted.

2. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials that are noncompatible or could result in corrosion or deterioration of either material or finishes.
- B. Fabricate sheet metal roofing panels 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 or wall panels so cross seams, when required, are made in direction of flow with higher pans overlapping lower pans. Stagger cross seams.
 2. Form and fabricate sheets, seams, strips, cleats, edge treatments, integral flashing, and other components of metal roofing to profiles, patterns, and drainage arrangements shown and as required for leak proof construction.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with non-acidic sealant (concealed within joints).
- D. Sealant Joints: Where movable, nonexpansion-type joints are indicated or required to produce weather tight seams, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

3 PART 3 EXECUTION

3.1 INSPECTION

- A. Contractor shall inspect all surfaces, areas and other contingent construction in or to which his work is to be installed and insure himself that they are in proper condition to receive the work to be performed under this Section.
- B. Verify that sheathing surfaces are sound, dry, properly secured and that provision has been made for flashings, anchorage, and all other interface items attaching to or penetrating through the Work of this Section.
- C. The Contractor shall notify the Architect in writing, before any work is installed, of any condition requiring correction. Failure to make such a report shall be construed as acceptance of the existing conditions and the responsibility to provide an acceptable installation.

3.2 PREPARATION

- A. Verify field dimensions before fabrication. Notify Architect of any discrepancies between field measurements and dimensions indicated in Construction Documents.
- B. Place membrane on substrate surfaces to receive metal panels; comply with manufacturer's instructions.
 1. Coordinate metal roofing and cladding with rain drainage work, flashing, trim and construction of parapets, walls, and other adjoining work to provide a weatherproof, secure and non-corrosive installation.

2. For end and side laps, see W.R. Grace's or equivalent manufacturer's recommendations.
- C. Where breather-type permeable membrane is specified, adhere to manufacturer's instructions and apply sealant to backside of clips to exclude water at fastener locations.

3.3 INSTALLATION

- A. Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being fabricated and installed.
1. Do not install in inclement weather
 2. Do not install over a damp substrate
 3. Do not install when inclement weather is threatening.
 4. If covering of zinc panels is required, provide free air flow around the zinc material to manufacturer's requirement to prevent white rust.
- B. Install work to be truly straight and square or conform to curvilinear geometry indicated on drawings.
1. Fabricate and install work with lines and corners of exposed units true and accurate.
 2. Form exposed faces free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal.
 3. Shim and align panel units within installed tolerance of ¼ inch in 20' –0"
 4. All seams shall be of uniform appearance and dimensions, straight and level with minimum exposure of solder and sealant.
 5. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.
 6. Form all seams to be weatherproof, leaving room for expansion and contraction with specified and required tolerances. Provide sealing tape to seams in areas prone to ice dams and continuously on roof slopes less than 10 degrees (2:12).
 7. Comply with RHEINZINK "Applications in Architecture" 2nd Edition and SMACNA Architectural Sheet Metal Manual for flashings and sheet metal work.
- C. Conceal fasteners and expansion provision 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.
- D. Provide work as indicated on approved shop drawings
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 and as required for rainproof construction.

- E. Separate non-compatible materials with a rubberized asphalt underlayment.
- F. Install work to meet specified performance requirements.

3.4 CLEANING AND PROTECTION

- A. Remove protective film (if any) from exposed surfaces of metal roofing promptly upon installation and in accordance with manufacturer's recommendations and with care to avoid damage to finish.
- B. Clean exposed metal surfaces of substances that would interfere with uniform oxidation and weathering and as recommended by panel manufacturer and maintain in a clean condition during construction.
- C. Ensure that cleaning by other trades working in proximity to zinc installation is in accordance with the recommendations of the zinc manufacturer.
- D. Damaged units: Replace panels and other components of the work that have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair.

3.5 CLEAN-UP

- A. During the progress of the work, keep premises clear of debris resulting from this operations and remove surplus and waste materials from the site as soon as possible.
- B. Upon completion of the work, Contractor shall remove from the site all equipment and materials used on the work as well as any debris resulting from the operations.

...END OF SECTION