

SECTION 07 41 13
METAL ROOF AND SOFFIT PANELS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - b. A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - c. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - d. C1311, Standard Specification for Solvent Release Sealants.
 - e. D226, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 - f. D523, Standard Test Method for Specular Gloss.
 - g. D1970, Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - h. D2178, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - i. E283, Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Skylight, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - j. E331, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - k. E903, Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
 - l. E1646, Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
 - m. E1680, Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
2. FM (Factory Mutual) Global (FMG):
 - a. Approval Guide.
 - b. 4471, Approval Standard for Class 1 Panel Roofs.

3. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Architectural Sheet Metal Manual.
4. UL: 580, Standard for Safety Tests for Uplift Resistance of Roof Assemblies.

1.02 SUBMITTALS

A. Action Submittals:

1. Product data for each component of specified metal panel system.
2. Shop Drawings: Drawings showing thickness and dimensions of parts and accessories, fastening and anchoring methods, details, and locations of seams, joints, and other provisions for thermal movement. Distinguish between factory-assembled and field-assembled work. Include drawings at not less than 1/4-inch to 1-foot scale and details at not less than 3-inch to 1-foot scale.
 - a. Submit Project specific details that demonstrate compliance with design documents.
3. Samples:
 - a. Manufacturer's color chart for initial color selection.
 - b. 12-inch square Samples of specified metal based on initial color selections from color chart(s). Samples will be reviewed for color and texture only.
4. Delegated-Design Submittal: Demonstrate metal roof panels comply with performance requirements and design criteria.
 - a. Comprehensive analysis of design loads, including dead loads, live loads, wind loads, snow loads, and thermal movement. Refer to Section 01 88 15, Anchorage and Bracing, and loads provided in General Structural Notes as shown.
 - b. Design drawings and structural calculations stamped and signed by license professional engineer registered in the State of Arizona responsible for their preparation. Include Shop Drawings as specified in this section.
 - c. Wind uplift calculations and analysis data in conformance with ASCE 7.

B. Informational Submittals:

1. Manufacturer's printed installation instructions.
2. A letter from roofing manufacturer stating roofer is approved by manufacturer to apply the roof.
3. Documentation of preliminary and preinstallation conference meeting minutes.

4. Product Test Reports: for each product, for tests performed by a qualified testing agency.
5. Special guarantee.
6. Certificate of Proper Installation from Manufacturer (or alternately, test results or calculations), that ensure item's and its anchorage's design criteria meets requirements of Section 01 88 15, Anchorage and Bracing, for loads provided.
7. Sustainable Design: In accordance with Section 01 81 13, Sustainable Design Requirements for Non-LEED™ Projects, document sustainability performance for items listed below.
 - a. Product Data for Recycles Materials:
 - 1) A complete list of materials and quantities.
 - 2) Percentages of post-consumer and pre-consumer recycled content of all materials.
 - b. Product Data for Low Emitting Materials-Adhesives, and Sealants:
 - 1) A complete list of adhesives and sealants used inside the building envelope during construction.
 - 2) Manufacturer's literature documenting VOC content of each product, and compliance with requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168.

1.03 QUALITY ASSURANCE

- A. Applicator's Qualifications: Approved and trained by materials manufacturer.
- B. Mockups:
 1. Before Work of this section begins, fabricate, for acceptance, approximately 3-foot by 2-foot sample roofing panel including fascia and soffit using materials and methods identical to those to be used on Project.
 2. Sample panel shall include typical seam, fasteners, ridges, eaves, gutters, soffit, downspouts, and valleys.
 3. Locate mockup where directed by the Contracting Officer.
 4. Accepted mockup constitutes minimum Project standards and shall be maintained for comparison with finished Work.
 5. Dispose of mockup when directed by the Contracting Officer.
- C. Preliminary Roofing Conference:
 1. Before starting roof deck construction, conduct onsite conference with Contracting Officer, roofing applicator, roofing system materials manufacturer, and Subcontractors likely to be on roof.

2. Agenda: Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to avoid delays. Discuss and resolve questions regarding acceptability of the deck, roofing system and materials, flashing details, roof insulation, and roofing. Document all discussions.
3. Identify any issues, details or materials that will void the Special Guarantee and Installer's Warranty.

D. Preinstallation Conference:

1. Before starting metal roof installation, conduct a conference with Contracting Officer, roofing applicator, roofing system materials manufacturer, Contracting Officer's insurer, Subcontractors likely to be on roof, and installers whose work affects metal roof installation.
2. Items to be reviewed and discussed include, but are not limited to, the following items:
 - a. Examine roof deck or substrate conditions for compliance with requirements for flatness and tolerance of structural members.
 - b. Review structural loading limitations of roof deck during roofing installation.
 - c. Review flashing details, roof drainage, roof insulation, roof penetrations, and other construction and conditions that might affect metal roof panel installation.
 - d. Review governing regulations and requirements for insurance, certificates, and testing and inspecting as applicable.
 - e. Review temporary protection requirements for metal roof panels during and after installation.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver components and metal roof and soffit panels so as not to be damaged or deformed. Package for protection during transportation and handling.
- B. Storage and Handling:
 1. Protect against damage and discoloration.
 2. Handle panels with nonmarring slings.
 3. Do not bend panels.
 4. Store panels aboveground on pallets or platforms, with one end elevated for drainage.
 5. Protect strippable protective covering from exposure to sunlight except as necessary for metal roof installation.
 6. Stack panels to prevent twisting, bending, or abrasion, and to provide ventilation.

7. Protect panels against standing water and condensation between adjacent surfaces.
8. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and separate sheets for air-drying.
9. During storage prevent contact with materials that may cause discoloration or staining.

1.05 COORDINATION

- A. Coordinate installation of roof accessories as specified in Section 07 70 01, Roof Specialties and Accessories.
- B. Coordinate metal roof installation with flashing and trim as specified in Section 07 62 00, Sheet Metal Flashing and Trim.
- C. Coordinate work with construction of decks and other adjoining work.

1.06 SPECIAL GUARANTEE

- A. Product: Provide manufacturer's extended guarantee or warranty, with Contracting Officer named as beneficiary, in writing, as Special Guarantee. Special Guarantee shall provide for correction or, at the option of the Contracting Officer, removal and replacement of roofing panels, flashing, finish, and accessories found defective during the period of time indicated below and after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work shall be as specified in the Contract clauses.
- B. Conditions:
 1. Roofing Panels: No rupture, structural failure, or perforation.
 - a. 20-year term.
 2. Finish or Roofing and Soffit Panels: No cracking, blistering, flaking, chipping, checking, chalking, peeling, or fading.
 - a. 20-year term.
 3. Roof System Components: Watertight and weathertight with normal usage not pro-rated, no dollar limit.
 - a. 25-year term.

PART 2 PRODUCTS

2.01 SUSTAINABLE MATERIAL REQUIREMENTS

- A. Physical Characteristics: None.
- B. Functional Characteristics: None.

C. Performance Characteristics:

1. Recycled Content of Metal Roof and Soffit Products: Provide products with a minimum combined recycled content of 30 percent and a minimum post-consumer recycled content of 20 percent.

2.02 ROOFING AND FASCIA PANELS

A. Manufacturers and Products:

1. Imetco; Zip-Rib.
2. Or equal.

B. Physical Characteristics:

1. Material: Prefinished galvalume coated steel sheet with galvalume coating consisting of 55 percent aluminum, 1.6 percent silicon, and balance of zinc as described in ASTM A792, 22-gauge minimum metal thickness.
2. Surface: Smooth, flat finish between stiffening ribs.
3. Finish: 2-Coat Fluoropolymer:
 - a. AAMA 621.
 - b. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
 - c. Thickness: Nominal; 1.0-mil minimum total dry film thickness consisting of primer and color coat.
4. Color: As indicated in Exterior Finish Schedule as shown.
5. Standing Seam, Seamed-Joint: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically space between vertical ribs designed for sequential field installation by mechanically attaching panels to supports using concealed clips located under one side of panel and engaging opposite edge of adjacent panels and mechanically seaming panels together.
6. Panel Coverage: 16 inches.
7. Panel Height: Minimum 2 inches.

C. Functional Characteristics: Field formed panels or panels formed on portable equipment are not acceptable.

D. Performance Characteristics:

1. Provide professional engineering services, by structural or civil engineer licensed in Arizona, needed to design roof system and assume engineering responsibility.

2. Performance Requirements for Roofing System:
 - a. Air Infiltration:
 - 1) Air leakage through assembly of not more than 0.06 cfm/square foot of roof area when tested in accordance with ASTM E1680 at the following test pressures:
 - a) Test Pressure:
 - (1) Roof Slope Less than or Equal to 30 Degrees: 1.57 lbf/square feet.
 - (2) Roof Slope Greater than 30 Degrees: Positive and negative 1.57 lbf/square feet.
 - b) Preload Test-Pressure Difference:
 - (1) Positive: Greater than or equal to 15 lbf/square feet and the greater of 75 percent of building live load or 50 percent of building design positive wind pressure difference.
 - (2) Negative: 50 percent of design wind uplift pressure difference.
 - b. Water Penetration:
 - 1) No water penetration when tested in accordance with ASTM E1646 at the following test pressures:
 - a) Test Pressure:
 - (1) Roof Slope Less than or Equal to 30 Degrees: 2.86 lbf/square feet.
 - (2) Roof Slope Greater than 30 Degrees: 20 percent of positive design pressure, but not less than 6.24 lbf/square feet and not more than 12 lbf/square feet.
 - b) Preload Test-Pressure Difference:
 - (1) Positive: Greater than or equal to 15 lbf/square feet and the greater of 75 percent of the building live load or 50 percent of the building design positive wind pressure difference.
 - (2) Negative: 50 percent of design wind uplift pressure difference.
 - c. Wind Uplift Resistance: Provide metal panel assemblies that comply with UL 580 for Class 90.
 - d. FMG Listing: Provide metal roof panels and system accessories that comply with FMG 4471 as part of a panel roofing system and are listed in FMG "Approval Guide" for Class 1 or noncombustible construction. Materials shall be marked with FMG markings.
 - 1) Fire/Windstorm Classification: Class 1A-90.
 - 2) Hail Resistance: SH.

- e. Structural Performance:
 - 1) Provide metal roof panel assemblies capable of withstanding the design loads provided in the General Structural Notes as shown.
 - 2) Deflection Limits: Engineer roof panel assemblies to withstand design loads with vertical deflections no greater than 1/180 of span.
- f. Thermal Movement: Provide metal roof panel assemblies that allow for thermal movement resulting from temperature change of 120 degrees F (67 degrees C), ambient and 180 degrees F (100 degrees C), material surface.
- g. Solar Reflectance, ASTM E903:
 - 1) Solar reflectance for roof slopes of 2:12 or less:
 - a) Initial: Not less than 0.65.
 - b) Maintained: Not less than 0.50 for 3 years after installation.
 - 2) Solar reflectance for roof slopes over 2:12:
 - a) Initial: Not less than 0.25.
 - b) Maintained: Not less than 0.15 for 3 years after installation.
- h. Glare Resistance: Specular reflectance of not more than 10 when measured in accordance with ASTM D523 at an angle of 85 degrees.

2.03 ROOFING ACCESSORIES

A. Gypsum Roof Sheathing and Cover Board:

- 1. Manufacturers and Products:
 - a. Georgia-Pacific; DensDeck Prime Roof Board.
 - b. Or equal.
- 2. Physical Characteristics:
 - a. Material:
 - 1) Nonstructural glass mat faced gypsum panel with water-resistant core; ASTM C1177/C1177M.
 - 2) Size: Minimum 4-foot by 8-foot with square edges.
 - a) Thickness:
 - (1) Roof Sheathing: 1/2 inch.
 - (2) Cover Board: 1/4 inch.
 - b. Fasteners: As recommended by panel manufacturer for wind uplift resistance requirements.
- 3. Functional Characteristics: None.
- 4. Performance Characteristics:
 - a. Flame Spread 25, Smoked Development 0, when tested in accordance with ASTM E84.
 - b. Noncombustible when tested in accordance with ASTM E136.

B. Self-Adhering Underlayment:

1. Manufacturers and Products:
 - a. Imetco; IntelliWrap PR.
 - b. Or equal.
2. Physical Characteristics: Cold-applied, vapor permeable, high temperature (250 degrees F minimum), self-adhering roofing underlayment, 35-mil minimum thickness.
3. Functional Characteristics: None.
4. Performance Characteristics:
 - a. Water Vapor Permeance (ASTM E96): 16.9 perms.
 - b. Nail Sealability (ASTM D7349): Pass.
 - c. Grab Tensile Strength (ASTM D1970): 88.2 lbf/in.
 - d. Flame Spread and Smoke Development (ASTM E84): Class A.

C. Rigid Roof Insulation:

1. Manufacturers and Products:
 - a. Atlas Roofing Corp.; AC Foam II.
 - b. Or equal.
2. Physical Characteristics:
 - a. Insulation Board:
 - 1) Polyisocyanurate Foam Board:
 - a) ASTM C1289, Type 2, Class 2, Grade 2, with Factory Mutual Class I approval.
 - b) Average Aged R-value for Total Thickness of Rigid Roof Insulation: R-35 minimum.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

D. Air and Vapor Barrier:

1. Manufacturers and Products:
 - a. Imetco; IntelliWrap UDL.
 - b. Or equal.
2. Physical Characteristics: Cold applied, self-adhering waterproofing underlayment; vapor impermeable. Composed of a non-slip polymer film laminated to a high temperature rubberized asphalt adhesive with release-liner backing, 0.45 mil thickness meeting ASTM D5147.
3. Functional Characteristics: None.
4. Performance Characteristics:
 - a. Vapor Permeance (ASTM E96): Less than 0.01.
 - b. Nail Sealability (ASTM D1970): Pass.

E. Holddown Clips:

1. Physical Characteristics:

- a. System manufacturer's ASTM A792/A792M standard shape steel.
- b. Provide clip designed to allow panels to thermally expand and contract. Clip shall incorporate a self-centering feature to allow a minimum of 1 inch of movement in both directions along panel length. Clip type and spacing shall be selected to meet positive and negative pressure as specified.

- 1) Clips shall be 18-gauge by 3 inches long minimum, with a minimum of three fasteners per clip.

2. Functional Characteristics: None.

3. Performance Characteristics: None.

F. Closures: Manufacturer's standard polychloroprene blocks shaped to fit roof metal profile.

G. Sealant: Factory-installed sealant to provide continuity of seal at clip locations.

2.04 METAL SOFFIT PANELS

A. Manufacturers and Products:

1. Imetco; FW Series.
2. Or equal.

B. Physical Characteristics:

1. General: Provide factory-formed metal soffit panels designed to be field-assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fastening and factory-applied sealant in side laps; included accessories for a complete, weathertight installation.

2. Flush Profile: Solid panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges with flush joint between panels.

a. Material:

- 1) Nonperforated Panel: Aluminum-zinc alloy coated sheet 22-gauge minimum metal thickness.

b. Finish:

- 1) 2-Coat Fluoropolymer:

- a) AAMA 621.
- b) Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

c. Color: As indicated in Exterior Finish Schedule as shown.

- d. Panel Coverage: 12 inches.
- e. Panel Height: Minimum 1 inch.
- 3. Clips:
 - a. Panel clips with spring tab at one end and hold-down clamp at other end, sized to fit panels.
 - b. Material: 16-gauge formed steel, galvanized in conformance with ASTM A653.
- C. Functional Characteristics: None.
- D. Performance Characteristics: None.

2.05 METAL WALL PANELS

- A. Manufacturers and Products:
 - 1. Imetco; FW Series.
 - 2. Or equal.
- B. Physical Characteristics:
 - 1. General: Provide factory-formed metal wall panels designed to be field-assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fastening and factory-applied sealant in side laps; included accessories for a complete, weathertight installation.
 - 2. Clips:
 - a. Panel clips with spring tab at one end and hold-down clamp at other end, sized to fit panels.
 - b. Material: 16-gauge formed steel, galvanized in conformance with ASTM A653.
 - 3. Flush Profile: Solid panels formed with vertical panel edges and flush joints between panels; capable of creating a reveal between panels.
 - a. Material: Aluminum-zinc alloy coated sheet, 22-gauge minimum metal thickness.
 - b. Finish:
 - 1) 2-Coat Fluoropolymer:
 - a) AAMA 621.
 - b) Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in coat.
 - c) Thickness: Nominal 1.0-mil minimum total dry film thickness consisting of primer and color coat.
 - c. Color: As indicated in the Exterior Finish Schedule as shown.
 - d. Panel Coverage: 12 inches.
 - e. Reveal Size: 1 inch.

- C. Functional Characteristics: None.
- D. Performance Characteristics:
 - 1. Structural Performance:
 - a. Provide metal wall panel assemblies capable of withstanding the design loads provided in General Structural Notes as shown.
 - b. Deflection Limits: Engineer wall panel assemblies to withstand design load with total deflections no greater than 1/180 of span.
 - 2. Water Penetration Under Static Pressure: No leakage at 12 psf when tested with sidalap sealant per ASTM E331.
 - 3. Thermal Movement: Provide metal wall panel assemblies that allow for thermal movement resulting from temperature change of 120 degree F, ambient and 180 degrees F, material surface. Provide fasteners and components that resist rotation and avoid shear stress as a result of system as a result system thermal movements.

2.06 GENERAL ACCESSORIES

- A. Fasteners:
 - 1. Physical Characteristics:
 - a. Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal by means of plastic caps or factory-applied coating.
 - b. Fasteners for Roof Panels: Self-drilling or self-tapping zinc-plated, hex-head carbon steel screws with stainless steel (Type 304 or Type 316) cap or zinc-aluminum alloy head with EPDM or PVC washer.
 - c. Fasteners for Flashing and Trim: Self-drilling screws with hex washer head or blind fastener rivets of high-strength aluminum or stainless steel (Type 304 or Type 316).
 - 2. Functional Characteristics: None.
 - 3. Performance Characteristics: None.
- B. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
- C. Closures: Manufacturer's standard polychloroprene blocks shaped to fit roof metal profile.

D. Sealant:

1. Physical Characteristics:
 - a. Joint Sealant: Type 5 as specified in Section 07 92 00, Joint Sealants, or as required by panel manufacturer.
 - b. Silicone Sealant: Type 1 as specified in Section 07 92 00, Joint Sealants, or as required by panel manufacturer.
 - c. Tape Sealant: Type 13 as specified in Section 07 92 00, Joint Sealants, or as required by panel manufacturer.
 - d. Butyl Sealant: Butyl-rubber based, solvent-release sealant per ASTM C1311.
2. Functional Characteristics: None.
3. Performance Characteristics:
 - a. Meet the following requirements:
 - 1) Volatile Organic Compound (VOC) Content: Comply with the following limits for VOC content when calculated according to South Coast Air Quality Management District Rule 1168.
 - a) Sealants:
 - (1) Architectural: 250 g/L.
 - (2) Nonmembrane Roof: 300 g/L.
 - (3) Other: 420 g/L.
 - b) Sealant Primers:
 - (1) Architectural – Nonporous: 250 g/L.
 - (2) Architectural – Porous: 775 g/L.
 - (3) Modified Bituminous: 500 g/L.
 - (4) Other: 750 g/L.

E. Isolation Paint: As specified in Section 09 90 00, Painting and Coating.

F. Light Gauge Support Framing for Soffit Panels: As specified in Section 09 22 16. Nonstructural Metal Framing.

2.07 FABRICATION

- A. Fabricate and finish metal roof panels, soffits, and accessories at factory to the greatest extent possible.
- B. Provide panel profile, including major ribs and any intermediate stiffening ribs for full panel length.
- C. Panel Length: Roof panels shall be full length from eave to ridge, unless otherwise indicated.
- D. Where indicated, fabricate metal roof panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact.

- E. Form and fabricate sheets, battens, strips, cleats, valleys, ridges, edge treatments, integral flashings, gutters, downspouts, and other components of specified metal roofing panels to profiles, patterns, and drainage arrangement shown, and as required for permanent leakproof construction, and as recommended by SMACNA's "Architectural Sheet Metal Manual."
- F. Provide for thermal expansion and contraction of Work.
- G. Conceal fasteners and methods of expansion where possible. Do not use exposed fasteners on faces of accessories where exposed to view.
- H. Finishes:
 - 1. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 - 2. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half the range of approved sample. Noticeable variations within same piece are not acceptable. Variations in other component appearances are acceptable if within range of approved samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions for compliance with alignment tolerances required by metal roof panel manufacturer. Examine solid roof sheathing to verify sheathing joints are supported by blocking or framing, and flatness is within tolerances required by metal roof panel manufacturer.
- B. Prior to beginning installation, examine rough-in location for items penetrating metal roof panels and coordinate with seam locations.

3.02 PREPARATION

- A. Deck: Firm, dry, free of foreign materials, and smooth. Report immediately to Contracting Officer cracks, breaks, holes, or other unusual irregularities in surface.
- B. Layout Pattern:
 - 1. Layout Pattern: Lay out to place seams equidistant from ends or roofs and soffits, and aligned with seams on other side of ridge.
 - 2. Coordinate Work of this section with flashing, trim, and other construction to provide a permanently leakproof, secure, and noncorroding installation.

3.03 INSTALLATION

A. General:

1. Apply roofing only in dry weather and where weather conditions permit.
2. Install in accordance with manufacturer's written instructions and warranty requirements.
3. Comply with recommendations of the SMACNA "Architectural Sheet Metal Manual."
4. Install metal roofing, fascia, and soffit system consisting of nonstructural sheet metal panels held to substrate with concealed fasteners.
5. Conceal expansion joint provisions wherever possible in exposed Work; locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for tight installation.
6. Light Gauge Support Framing for Soffit:
 - a. As specified in Section 09 22 16, Nonstructural Metal Framing.
 - b. Coordinate locations with proposed soffit panel installation.
7. Closures and Trim:
 - a. Provide ridges, valleys, eaves, rakes, fascia, soffit, gutters, downspouts, and other exposed trim and flashing for a weather-tight roofing system.
 - b. Provide metal closures at each side of ridge caps.
 - c. Flash and seal metal roof panels with weather closures at eaves, rakes, and at perimeter of openings. Fasten with self-tapping screws.
8. Install ridge caps as the metal roof panel work proceeds.
9. Dissimilar Metals:
 - a. Separate from each other where electrolysis might occur.
 - b. Separate metal panels where contact with corrosive substrates may occur.
 - c. Separation is satisfactorily accomplished by coating metals with isolation Paint.
 - d. Comply with various metals producers' recommendations for other forms of protection against contamination from corrosive materials or agents.
10. Lap metal flashing over metal roof panels to allow moisture to run over and off the material.
11. Cutting and Fitting: Neat, square, and true. Saw cut panels, deburr, and use touchup paint immediately as recommended by roofing panel manufacturer. Torch cutting is prohibited.
12. Gutters, Downspouts, and Flashings:
 - a. Straight, weather-tight, exposed surfaces free of dents, scratches, abrasions, stains, and other visible defects.
 - b. Extend gutter lining under metal roofing 6 inches minimum and terminate in 3/4-inch folded edge secured by cleats.

13. Valleys:
 - a. Form of sheets not exceeding 10 feet in length. Lap joints 6 inches in direction of drainage.
 - b. Extend valley sheet minimum 6 inches under roofing sheets.
 - c. At valley, double fold valley and roofing sheets, and secure with cleats spaced 18 inches on center.

B. Cover Board:

1. Examine substrate to support cover board and verify that the surface does not vary more than 1/4 inch from the plane of faces of adjacent members.
2. Verify that supporting materials are in place and ready for cover board attachment prior to starting Work.
3. Correct detrimental conditions before proceeding with installation.
4. Use appropriate length boards to minimize joints. Stagger end joints, if required. Butt joints between panels loosely. Do not force panels into place.
5. Attach cover board to roof deck in compliance with ASTM C954 and as required to meet requirements of Project design loads specified herein.
6. Proceed from the central portion of the board toward ends and edges, using power screwdriver recommended by the manufacturer to drive screws.
7. Drive fasteners to bear tight against and flush with surface of cover board without countersinking or deep enough to break the glass-mat.
8. Locate fasteners not closer than 3/8 inch from the edge and the ends of the cover board panels. Maximum fastener spacing for vertical or horizontal surfaces in 8 inches.

C. Air and Vapor Barrier: Install over cover board in accordance with manufacturer's recommendations including proper surface preparation and condition, application of primers and additional measures required for a proper installation.

D. Rigid Roof Insulation:

1. Install thickness necessary for R-value indicated. Use two layers minimum of insulation.
2. Mechanically fasten with Factory Mutual approved fastener in pattern recommended by roofing manufacturer to meet requirements of Project design loads.
3. Position boards of first layer so end joints are staggered, and edges are supported by roof deck.
4. Install additional layers with joints staggered 4 inches minimum from those below.

E. Gypsum Roof Sheathing:

1. Examine substrate to support sheathing board and verify that the surface does not vary more than 1/4 inch from the plane of faces of adjacent members.
2. Verify that supporting materials are in place and ready for sheathing attachment prior to starting Work.
3. Correct detrimental conditions before proceeding with installation.
4. Use appropriate length boards to minimize end joints. Stagger end joints, if required. Butt joints between panels loosely. Do not force panels into place.
5. Attach sheathing to roof deck in compliance with ASTM C954 and as required to meet requirements of Project design loads specified herein.
6. Proceed from the central portion of the board toward ends and edges, using power screwdriver recommended by the manufacturer to drive screws.
7. Drive fasteners to bear tight against and flush with the surface of the sheathing without countersinking or deep enough to break the glass-mat.
8. Locate fasteners not closer than 3/8 inch from the edge and the ends of the sheathing panels. Maximum fastener spacing for vertical or horizontal surfaces is 8 inches.

F. Self-Adhering Underlayment:

1. Install self-adhering underlayment on gypsum roof sheathing, as shown, unless otherwise recommended by metal roof panel manufacturer.
2. Apply self-adhering underlayment single-ply lapped shingle fashion, 3 inches at head and 6 inches at sides, in accordance with manufacturer's instructions.
3. Install no more than can be covered by metal roofing or other approved protection, in same day.
4. Use adhesive for temporary anchorage, where possible, to minimize use of mechanical fasteners under metal roof panels.

G. Standing-Seam Metal Roof:

1. Roof Panels:
 - a. Begin at ridge. Rigidly fasten ridge of metal roof panels and allow low eave end free movement for thermal expansion and contraction unless otherwise required by manufacturer.
 - b. Install clips in panel side joints at location, spacing, and with fasteners as recommended by manufacturer for type of substrate and wind loading specified and in accordance with manufacturer's calculations based on Project design loads.
 - c. At ridge provide ridge cap.

- d. Cross Seams:
 - 1) Not allowed. Provide full-length from eave to peak.
 - 2) Edges:
 - a) Extend flashing under metal roofing 6 inches minimum and terminate in 3/4-inch folded edge secured by cleats.
 - b) Hook lower end of roofing into lock strip to form 3/4-inch wide loose-lock seam.
- e. Peak Covers: Secure in-place using Z-closer clips and fasteners. Seal joints where necessary for watertightness.

H. Metal Soffit Panels:

- 1. Provide full width of soffit. Install perpendicular to light-gauge support framing. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of openings and joints.
- 2. Contractor to furnish light-gauge metal framing at locations required to support metal soffits.
- 3. Provide back support for panels at mitered corners.

I. Metal Wall Panels:

- 1. Begin at base of wall. Overlap and secure panels to wood support framing with concealed fasteners, in accordance with manufacturer's instructions.
- 2. Contractor to furnish wood framing at locations required to support metal wall panels.
- 3. Align bottom edge for a straight true line. Provide full height of wall terminate at underside of soffit. Trim, flash, and seal panels with weather closures where metal wall panels meet soffit, adjoining walls, and structural members.

- J. Fascia Panels: Align bottom edge for a straight true line. Flash and seal panels with weather closures where metal fascia panels meet walls, along lower panel edges, and at perimeter of all openings and joints.

3.04 CLEANING AND PROTECTION

A. Cleaning:

- 1. At end of each day, sweep metal clean of foreign materials, especially metal particles and scrap.
- 2. Peel off strippable film.
- 3. Where needed, clean metals in conformance with metals industry recommendations or use Basic H organic metal cleaner, Shaklee Products, Hayward, CA.

B. Protection:

1. Protect material from exposure to chlorides, hydrochloric-based and muriatic acids. If contaminated, wash affected areas immediately with 5 percent soda and water solution and rinse with clear water.
2. Avoid walking on roof after completion.

C. Final Cleanup:

1. Remove debris, metal clips, nails, and other materials that could prevent adequate drainage or produce corrosion products through electrolysis.
2. Repair and touch up damage.
3. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair.

END OF SECTION

