SECTION 074114

STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

* 1. RELATED DOCUMENTS
     1. Drawings and other Contract Documents, listed in the agreement between the Owner and Contractor, apply to this Section.
  2. SUMMARY
     1. Section includes standing-seam metal roof panels.
  3. PREINSTALLATION MEETINGS
     1. Pre-installation Conference: Conduct conference at Project site.
  4. DESIGN AND PERFORMANCE REQUIREMENTS
     1. Complete engineered system by manufacturers engineering department including
     2. Design Load:
        1. Calculate wind uplift using ASCE-‘10
        2. Calculate clip spacing
        3. Verify stress and deflection of panel meet project design load
        4. Verify project design load conditions with ASTM 1592
        5. Verify project design load conditions with UL580 class 90
     3. Air Infiltration:
        1. <.01 cfm/sf @ 20 psf pressure differential per ASTM E 1680
     4. Water Resistance:
        1. No water penetration under 5 gal/hr spray at 20 psf pressure differential per ASTM E 1646
     5. Static Water Pressure Head Test:
        1. No leakage up to 6 hours per ASTM E 2140-01
     6. UL-Approved Rated Fire Roofs:
        1. 1, 1 ½ and 2 hour fire-rated assemblies per UL construction numbers P225, P510, P514, P516, P701 and P715
     7. UL90 Rating:
        1. 24 ga. steel or 0.032" 18” aluminum panels with stainless steel clips installed over 16 ga. purlins (Grade 50 steel) spaced at maximum of 5'-0" o.c.
        2. 24 ga. steel or 0.032" 18” Aluminum panels with stainless steel clips at maximum of 3'-0" o.c. installed over Loadmaster Roof Deck System.
        3. 24. ga. steel or 0.032" 18” Aluminum panels with stainless steel clips spaced a maximum of 45-0" o.c. installed over 22 ga. metal deck and up to 6" of rigid insulation and bearing plates to support clips.
        4. 24 ga. steel or 0.032" 18”aluminum panels with stainless steel clips spaced at maximum of 2'-0" o.c. over ½" plywood decking
     8. ASTM 1592:
        1. 24 ga. 18” Steel Panels:
           1. 38.55 psf @ 5’
           2. 107.88 psf @ 15”
        2. 22 ga 18” Steel Panels
           1. 57.76 psf @ 5’
           2. 122.97 psf @ 15”
        3. .040” 18” Aluminum Panels
           1. 52.12 psf @ 4’
           2. 157.70 psf @ 1’
     9. Factory Mutual:
        1. I-180 22 ga 18” Steel Panels @ 2.5’
        2. I-120 24 ga 18” Steel Panels @2.5’
        3. I-120 22 ga 18” Steel Panels @ 5’
        4. I-90 24 ga 18” Steel Panels @3’-4”
        5. I-75 22 ga 18” Steel Panels @5’
        6. I-60 24 ga 18” Steel Panels @ 5’
     10. Roofing Systems Certified for Canada
         1. UL TGFU7-R9288
     11. Panels must have job site forming capabilities for projects with long panel runs over 50’
     12. Panels must be able to have factory radius down to 10’
  5. SUBMITTALS
     1. Product Data: For each type of product.
        1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
     2. Shop Drawings:
        1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
        2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

# 3. If a WTW is required, shop drawings or Fabrals standard details must be reviewed by the manufacturer prior to installation

* + 1. Samples: For each type of exposed finish required, prepared on Samples of size indicated below.
       1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.
       2. Include similar Samples of trim and accessories involving color selection.
    2. Qualification Data: For Installer.
    3. Product Test Reports: For each product, for tests performed by a qualified testing agency.
    4. Field quality-control reports.
    5. Sample Warranties: For special warranties.
    6. Maintenance Data: For metal panels to include in maintenance manuals.
  1. QUALITY ASSURANCE

# Installer Qualifications: [An entity that employs installers and supervisors who are trained and approved by manufacturer.][Installer of sheet metal roofing for a minimum of 10 years documented experience.]

* + 1. Panel Manufacturer: Minimum of 10 years experience in manufacturing architectural roof panels in a permanent stationary indoor facility. Provide facility information if requested.
  1. DELIVERY, STORAGE, AND HANDLING
     1. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
     2. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
     3. Store panels, flashings and accessories ion a safe, dry environment under a waterproof breathable covering to prevent water damage. Allow for adequate ventilation to prevent condensation. Panels and flashings with strippable film shall not be stored in direct sunlight.
     4. Remove strippable protective covering on metal panels during installation.

# Upon receipt of delivery of metal panel system, and prior to signing the delivery ticket, the installer is to examine each shipment for damage and for completion of the consignment.

* 1. FIELD CONDITIONS
     1. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.
  2. COORDINATION
     1. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
     2. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
  3. WARRANTY
     1. Material and Workmanship Warranty: Manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
        1. Failures include, but are not limited to, the following:
           1. Structural failures including rupturing, cracking, or puncturing.
           2. Deterioration of metals and other materials beyond normal weathering.
        2. Warranty Period: Two years from date of Substantial Completion.
     2. Paint Finish Warranty: 30 years from date of Substantial Completion. If metallic colors are used, the “fade” part of the warranty shall be removed.

# 30 years for Kynar type finish.

2. 20 years for Metallic/Mica finish, Custom finish

* + 1. Installer’s Warranty: Submit installer's warranty, signed by Installer, covering the Work of this Section, including all components of roof panels for the following warranty period:
       1. Warranty Period: Two years from date of Substantial Completion
    2. Weather-tight Warranty:
       1. Warranty Period: Twenty years from date of Substantial Completion

PART 2 - PRODUCTS

* 1. MANUFACTURER
  2. Fabral® Facilities:

Jackson, GA

Telephone: 800.884.4484 Website: [www.fabral.com](http://www.fabral.com/)

Grapevine, TX Telephone: 800.477.9066 Website: [www.fabral.com](http://www.fabral.com/)

Cedar City, UT

Telephone: 800.432.2725 Website: [www.fabral.com](http://www.fabral.com/)

* 1. STANDING-SEAM METAL ROOF PANELS

**Powerseam**

* 1. AZ50 Galvalume Steel:
     1. Material Gauge: [**24**][**22**] gauge.
     2. Exterior Finish: As selected from manufacturer’s premium finishes.
     3. Color: As selected from manufacturer’s full range.
  2. Aluminum:
     1. Material Thickness: [**0.032**][**0.040**] thick.
     2. Surface: [**Smooth, flat**] **[Stucco Embossed]** finish.
     3. Exterior Finish: As selected from manufacturer’s premium finishes.
     4. Color: As selected from manufacturer’s full range.
  3. Rib Spacing: Manufacturer’s standard.
  4. Panel Coverage: [**12**][**16**][18] inches.
  5. Panel Height: 2 inch.
  6. AZ50 Galvalume Steel:
     1. Material Gauge: [**24**][**22**] gauge.
     2. Exterior Finish: As selected from manufacturer’s premium finishes.
     3. Color: As selected from manufacturer’s full range.

* 1. MATERIALS
     1. Metallic-Coated Steel Sheet: aluminum-zinc alloy-coated steel sheet (Galvalume) complying with ASTM A 792/A 792M, Class AZ50/AZ55 coating designation; structural quality. Pre-painted by the coil- coating process to comply with ASTM A 755/A 755M.
     2. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
  2. MISCELLANEOUS MATERIALS
     1. Miscellaneous Metal Sub-framing and Furring: Provide manufacturer's standard sections as required for support and alignment of metal panel system.
     2. Panel Accessories: Provide components required for a complete, weather-tight panel system including trim, copings, fasciae, mullions, sills, corner units, panel clips, flashings, sealants, gaskets, fillers, panel closures, and similar items. Match material and finish of metal panels unless otherwise indicated.
     3. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
     4. Panel Fasteners: Self-tapping screws designed to withstand design loads.
     5. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are non-staining, and do not damage panel finish.
        1. Sealant Tape: Buytl
        2. Joint Sealant: One Part Poly
        3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.
  3. FABRICATION
     1. General: Provide factory-formed metal roof panel system complying with ASTM E 1514 requirements.
     2. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
     3. Form panels in continuous lengths, endlaps are not permitted.
     4. Field forming of panels shall be done by factory employees operating the machines.
     5. Fabricate metal panel joints with factory-installed butyl sealant that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
     6. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
        1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and

tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

* + - 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
      2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
      3. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
      4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
      5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
         1. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.
  1. FINISHES
     1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
     2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. 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.

1. Steel Panels and Accessories:
   1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Mica Fluoropolymer: AAMA 621. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Three-Coat Metallic Fluoropolymer: AAMA 621. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
2. Aluminum Panels and Accessories:
   1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Mica Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Three-Coat Metallic Fluoropolymer: AAMA 2605. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   4. Exposed Anodized Finish:
      1. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.
      2. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-** **M12C22A32/A34, Class II, 0.010 mm**] or thicker.

PART 3 - EXECUTION

* 1. EXAMINATION
     1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
        1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
        2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
     2. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
     3. Proceed with installation only after unsatisfactory conditions have been corrected.
  2. PREPARATION
     1. Miscellaneous Supports: Install sub-framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.
  3. METAL PANEL INSTALLATION
     1. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
        1. Shim or otherwise plumb substrates receiving metal panels.
        2. Flash and seal metal panels at perimeter of all openings. Refer to manufacturers recommendations.
        3. Install flashing and trim as metal panel work proceeds.
        4. Panels to be in one continuous length, long length roofs must be field formed by Manufacturer.
        5. Provide weather-tight escutcheons for pipe- and conduit-penetrating panels.
     2. Fasteners:
        1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized- steel fasteners for surfaces exposed to the interior.
        2. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
     3. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
     4. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
     5. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
        1. Install clips to supports with self-tapping fasteners.
        2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
        3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so metal roof panels, and factory-applied sealant are completely engaged.

* + 1. Accessory Installation: Install accessories with positive anchorage to building and weather tight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
    2. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
       1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
       2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
  1. ERECTION TOLERANCES
     1. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
  2. FIELD QUALITY CONTROL
     1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.
     2. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
     3. Prepare inspection reports.
     4. Installer must have installation shop drawings on site at all times.
  3. CLEANING AND PROTECTION
     1. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
     2. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION