



Sheffield Metals International Guide Specification - SMI 1.5" Mechanical Seam Standing Seam Panels over Plywood Roof Deck

Sheffield Metals International (SMI) 1.5" Mechanical Seam Standing Seam Panels with 1½-inch high mechanically seamed ribs for installation over minimum ½ inch thick plywood roof deck with a minimum slope of 2 inches in 12 inches (2/12). With slopes lower than a 2/12 roof pitch, contact SMI Technical Department for further installation direction and requirements. SMI 1.5" Mechanical Seam Standing Seam Panels are available with Florida State Building Code Product Approval and Texas Department of Insurance certificates. Contact SMI Technical Department to verify decking assembly.

Sheffield Metals International (SMI) provides Engineered Standing Seam Metal Roof (SSMR) systems throughout the entire United States including Alaska, Hawaii, and the Caribbean. We provide complete package engineering and continuous support for the most complex projects. We are also a leader in the distribution of coated and bare metal products. We specialize in providing painted Galvalume® and aluminum for the architecturally driven metal panel industry, including:

- More than 50 Sherwin Williams® colors continuously stocked in Galvalume®
- Several popular colors in aluminum products in both coil and sheet
- Products meeting LEED requirements
- Color matching for virtually any custom color
- Zinc (elZinc®), stainless steel, and copper products in both coil and sheet
- 40-year Kynar® and 40-year silicone-modified polyester (SMP) coating warranties
- 5- to 35-year weathertight warranties- SMI warranty documents are available for viewing online
- Premium metal supplier coast to coast via five regional distribution centers

SMI's Architectural Department gives the architectural community access to their product data, testing and installation details. Their representatives have extensive backgrounds in the technical design, bidding, and installation phases of architectural metals work. SMI's full-time, in-house Technical Department assists with proper panel profile selection, architectural detailing, engineering requirements, architectural submittals, estimating services, roll-forming machine training and support, technical and installation questions, and project problem solving. SMI's Technical Department manages weathertight warranties in-house, performing inspections directly without the use of third party inspectors.

Specifiers: In order to hide the Specifier notes, click on File, then Options, then Display and uncheck Hidden Text, click OK and close. To reveal the Hidden Text, follow steps as in hide, but then check Hidden Text, click OK and close. To print document with Hidden Text, at Display check Print Hidden Text.

Contact: Sheffield Metals International (800) 283-5262; specifications@sheffieldmetals.com; www.sheffieldmetals.com

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SECTION 074113.16 - METAL ROOF PANELS, STANDING SEAM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Mechanically seamed standing seam metal roof panels installed over a plywood roof deck with related metal trim and accessories.

1.2 RELATED REQUIREMENTS

- A. Division 01 Section "Sustainable Design Requirements" for related sustainable design general requirements.
- B. Division 06 Section "Rough Carpentry" for related requirements.
- C. Division 07 Section "Air Barriers" for air barriers adjacent to roof assembly.
- D. Division 07 Section "Metal Wall Panels" for formed metal wall panels.
- E. Division 07 Section "Sheet Metal Flashing and Trim" for formed sheet metal copings, flashing and reglets, and roof drainage items in addition to items specified in this Section.
- F. Division 07 Section "Manufactured Roof Specialties" for manufactured copings, flashing and reglets, and roof drainage items in addition to items specified in this Section.
- G. Division 07 Section "Snow Guards" for prefabricated devices designed to hold snow on the roof surface.
- H. Division 07 Section "Joint Sealants" for field-applied joint sealants.

1.3 REFERENCES

- A. American Architectural Manufacturer's Association (AAMA): www.aamanet.org:
 - 1. AAMA 621 – Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
 - 2. AAMA 809.2 – Voluntary Specification Non-Drying Sealants.
 - 3. AAMA 2605 – Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:
 - 1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM): www.astm.org:
 - 1. ASTM A 653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A 755 – Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products.

3. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
4. ASTM B 209 – Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
5. ASTM C 754 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
6. ASTM C 1177 – Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
7. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
8. ASTM D 2244 – Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
9. ASTM D 4214 – Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
10. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
11. ASTM E 1646 – Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
12. ASTM E 1680 – Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
13. ASTM E 1980 – Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
14. ASTM E 2140 – Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head.

D. Florida Building Code: www.floridabuilding.org:

1. Testing Application Standard (TAS) No. 100-95 – Test Procedure for Wind and Wind Driven Rain

E. International Code Council Evaluation Service (ICC-ES): www.icc-es.org:

1. ICC ES AC188 – Acceptance Criteria for Roof Underlayments.

F. Underwriters Laboratories, Inc. (UL): www.ul.com:

1. UL 580 – Tests for Uplift Resistance of Roof Assemblies
2. UL 1897 – Standard for Uplift Tests for Roof Covering Systems
3. UL 2218 – Impact Resistance of Prepared Roof Covering Materials
4. UL 790 – Standard Test Methods for Fire Tests of Roof Covering Systems

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Prior to erection of framing, conduct pre-installation meeting attended by Owner, Architect, manufacturer's representative, inspection agency, structural-support Installer, and related trade contractors.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years' experience in manufacture of similar products in successful use in similar applications.
 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

- a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Side by side comparison of specified characteristics.
 - c. Samples of each component.
 - d. Project references: Minimum of five completed installations, with Owner and Architect contact information.
 - e. Sample warranty.
- 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 - 3. Approved manufacturers must meet separate requirements of Submittals Article.
- B. Installer Qualifications: Experienced Installer certified by metal roof panel manufacturer with minimum of five years' experience with successfully completed projects of a similar nature and scope.
- 1. Installer's Field Supervisor: Certified by metal roof panel manufacturer with minimum of five years' experience with successfully completed projects of a similar nature and scope, able to communicate with workers and Architect, supervising work on site whenever work is underway.

1.6 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets for specified products.
- 1. Include data indicating compliance with performance requirements.
 - 2. Include structural data indicating compliance with requirements of authorities having jurisdiction.
- B. Sustainable Design Submittals:
- 1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
 - 2. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content.
- C. Shop Drawings: Show layout of metal roof panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, roof accessories, and special details.
- D. Samples for Initial Selection: For each exposed product specified. Provide representative color charts of manufacturer's full range of colors.
- E. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Information: For Installer firm and Installer's field supervisor.
- B. Product Test Reports: Upon request, for each product, for tests performed by a qualified testing agency.

- C. Manufacturer's Warranty: Sample copy of manufacturer's standard warranty.
- D. Florida State Building Code Evaluation Certificate: Manufacturer's certificate of compliance indicating that products utilized on Project comply with requirements. Include documentation of approved quality assurance program.
- E. Texas Department of Insurance (TDI) Product Evaluation Certificate: Manufacturer's certificate of compliance indicating that products and installation utilized on Project comply with requirements.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Manufacturer's Warranty: Executed copy of specified warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
 - 1. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
 - 2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.

1.10 COORDINATION

- A. Coordinate plywood decking profile selection required for compliance with wind uplift requirements of metal roof panel system.
- B. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.
- C. 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.

1.11 WARRANTY

- A. Substrate Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials within specified warranty period when exposed to normal atmospheric conditions.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period:
 - a. Painted AZ50 Galvalume: 25-Years, 6-Months after shipment from manufacturer.

- b. AZ55 Non-painted Acrylic-Coated Galvalume Plus: 25-Years, 6-Months after shipment from manufacturer.
 - c. Painted Aluminum: 20-Years, 6-Months after shipment from manufacturer.
- B. Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal roof panels that evidence deterioration of factory-applied finish under normal atmospheric conditions, including:
 - 1. Fluoropolymer Paint System:
 - a. Color fading exceeding 5 Hunter units per ASTM D 2244.
 - b. Chalking exceeding No. 8 rating per ASTM D 4214.
 - c. Failure of adhesion, peeling, checking, or cracking.
 - d. Finish Warranty Period, Paint Finish: 40-Years from date of installation.
- C. Weathertightness Warranty: On Manufacturer's standard form, in which Manufacturer and Installer jointly agree to repair or replace metal panel assemblies furnished by manufacturer [, without monetary limitation,] that fail to remain weathertight, including leaks, within the Warranty Period.
 - 1. Weathertightness Warranty Period: <Insert applicable period> years from date of installation.
 - a. Standard Weathertightness Warranty: [5] [10] [15] [20] [25] [30] [35].
 - b. Without Monetary Limitation (NDL) Warranty: [10] [15] [20] [25] [30] [35].
- D. Special Installer Warranty: Furnish a written warranty signed by the Panel Installer agreeing to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: <Insert applicable period> years from date of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Manufacturer: **Sheffield Metals International**, (800) 283-5262; specifications@sheffieldmetals.com; www.sheffieldmetals.com.
 - 1. Provide basis of design product [,or comparable product approved by Architect prior to bid].
- B. Manufacturer/Source: Provide metal roof panel assembly and exposed sheet metal accessories from a single manufacturer meeting quality assurance requirements of this Section.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.

- B. Recycled Content: For Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than [25] percent.
- C. Radiative Property Performance:
 - 1. Solar Reflectance Index (SRI) for Roof Slope 2:12 or Less: Three-year aged SRI minimum 64 or initial SRI minimum 82, per ASTM E 1980.
 - 2. Solar Reflectance Index (SRI) for Roof Slope Greater than 2:12: Three-year aged SRI minimum 32 or initial SRI minimum 39, per ASTM E 1980.
- D. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with UL 580, or UL 1897, and to resist uplift pressures.
 - 1. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class UL 90.
 - 2. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings per ASCE-7.
- E. Florida State Building Code Evaluation Certificate: Manufacturer's certificate of compliance indicating that products utilized on Project comply with requirements. Include documentation of approved quality assurance program.
- F. Texas Department of Insurance (TDI) Product Evaluation Certificate: Manufacturer's certificate of compliance indicating that products and installation utilized on Project comply with requirements.
- G. Hail Resistance: Provide metal roof panel assemblies listed as Class 4 hail resistant and tested in accordance with UL 2218.
- H. Air Infiltration, ASTM E 1680: Maximum 0.01 cfm/sq. ft. at static-air-pressure difference of 1.57 psf.
- I. Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 12 psf.
- J. Wind Driven Rain Resistance: Provide metal roof panel assemblies tested in accordance with Testing Application Standard (TAS) 100-95: Test procedures for wind and wind driven rain resistance of discontinuous roof systems.
- K. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- L. Fire Resistance: Class A Fire Rating in accordance with UL 790.
- M. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
- D. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with UL 580, or UL 1897, and to resist uplift pressures.
 - 1. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class UL 90.

2. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings per ASCE-7.
- E. Hail Resistance: Provide metal roof panel assemblies listed as Class 4 hail resistant and tested in accordance with UL 2218.
- F. Air Infiltration, ASTM E 1680: Maximum 0.002 cfm/sq. ft. at static-air-pressure difference of 1.57 psf.
- G. Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 6.24 psf.
- H. Wind Driven Rain Resistance: Provide metal roof panel assemblies tested in accordance with Testing Application Standard (TAS) 100-95: Test procedures for wind and wind driven rain resistance of discontinuous roof systems.
- I. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- J. Fire Resistance: Class A Fire Rating in accordance with UL 790.
- K. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

2.3 METAL ROOF PANELS

- A. Mechanically Seamed, Concealed Fastener, Standing Seam Metal Roof Panels: Metal roof panel consisting of formed metal sheet with standing ribs at panel edges, installed by lapping and mechanically interconnecting edges of adjacent panels, and attaching panels to supports using concealed clips and fasteners in a weathertight installation.
 1. Basis of Design: **Sheffield Metals International, SMI 1.5" MS Standing Seam Metal Roof Panel.**
 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, structural quality, Grade 50, pre-painted by the coil-coating process per ASTM A 755/A 755M.
 - a. Minimum Thickness: [0.0236 inch/24 gage (0.59 mm)] [0.0376 inch/22 gage (0.86 mm)] coated thickness.
 - b. Metal Panel Surface: [Smooth] [Stucco embossed].
 - c. Exterior Finish: [Fluoropolymer two-coat system] [Fluoropolymer three-coat system] [Non-painted Galvalume Plus AZ55 with acrylic coating].
 - d. Color: [As indicated on Drawings] [As selected by Architect from manufacturer's full range of standard colors] [Match Architect's custom color].
 3. Aluminum Sheet: Coil-coated sheet, ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: [0.032 inch (0.81 mm) - 0.029 inch minimum (0.74 mm)] [0.040 inch (1.02 mm)].
 - b. Metal Panel Surface: [Smooth] [Stucco embossed].

- c. Exterior Finish: [Two-coat fluoropolymer] [Three-coat fluoropolymer].
 - d. Color: [As indicated on Drawings] [As selected by Architect from manufacturer's full range of standard colors] [Match Architect's custom color].
- 4. Roof Slope: Minimum 2/12; <Insert roof slope>.
 - 5. Panel Seam Height: 1.5 inch (38.1 mm).
 - 6. Panel Width: <Insert panel width>.
 - 7. Pan Configuration: [Flat] [Striated] [Minor ribbed].
 - 8. Joint Type: Field mechanically seamed 180 degrees.

2.4 METAL ROOF PANEL ACCESSORIES

- A. Panel Clips for Steel Sheets: As per Manufacturer's Engineering Report, a standard two-piece expansion clip with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, with 22ga. (0.79 mm) base and 24ga. (0.63 mm) top.
- B. Panel Clips for Aluminum Sheets: As per Manufacturer's Engineering Report, a standard two-piece expansion clip with ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, with 18ga. (1.27 mm) base and 24ga. (0.63 mm) top.
- C. Panel Fasteners: Self-tapping screws and other acceptable corrosion-resistant fasteners recommended by metal roof panel manufacturer for specified application. Where exposed fasteners cannot be avoided, supply fasteners with EPDM or neoprene gaskets, and heads matching color of metal panels by means of factory-applied coating.
- D. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
 - 1. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
 - 2. Concealed Joint Sealant: Non-curing butyl, AAMA 809.2.

2.5 ROOF SYSTEM ACCESSORIES

- A. Formed Metal Accessories: Provide complete metal roof assembly incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings as required for Project, in metal roof panel manufacturer's recommended profiles. Provide required fasteners, closure strips, support plates, and sealants.
 - 1. Match material, thickness, and finish of metal panels.
- B. Roof Accessories: Approved by metal roof panel manufacturer. Refer to Division 07 section "Roof Accessories" for requirements for roof accessories.
- C. Snow Guards: Approved by metal roof panel manufacturer. Refer to Division 07 section "Snow Guards" for requirements for snow guards attached to metal roof panels.

2.6 SUBSTRATE BOARDS

- A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M.
 - 1. Type and Thickness: [Regular, 1/2 inch (13 mm)] [Type X, 5/8 inch (16 mm)].

- B. Substrate-Board Fasteners: Factory-coated steel fasteners and metal or plastic plates, corrosion-resistant, designed for fastening substrate board to substrate.

2.7 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Multilayer Laminated Underlayment Sheet: ICC-ES AC188 compliant high tensile strength sheet, minimum 25 mils (0.63 mm) thick minimum, consisting of polypropylene membrane with a slip-resisting top surface suitable for contact with metal roofing, and adhesive layer with release-paper backing.
 - 1. Basis of Design Product: Kirsch Building Products, [SharkSkin Ultra SA](#).
 - 2. UV Exposure Rating: 12 months.
 - 3. Tensile Strength, ASTM D 226: 106 lbf/in (30.4 kN/m), cross-machine direction.
 - 4. Self-Sealability, ASTM D 1970: Pass.
 - 5. Flame Spread, ASTM E 84: Class A.
- B. High-Temperature Multilayer Laminated Underlayment Sheet: ICC-ES AC188 compliant high tensile strength sheet, minimum 16 mils (0.41 mm) thick minimum, consisting of polypropylene membrane with a slip-resisting top surface suitable for contact with metal roofing.
 - 1. Basis of Design Product: Kirsch Building Products, [SharkSkin Ultra](#).
 - 2. UV Exposure Rating: 12 months.
 - 3. Tensile Strength, ASTM D226: 106 lbf/in (30.4 kN/m), cross-machine direction.
 - 4. Self-Sealability, ASTM D 1970: Pass.
 - 5. Flame Spread, ASTM E 84: Class A.

2.8 FABRICATION

- A. General: Provide fabricated and finished metal panels and metal panel accessories meeting performance requirements, indicated profiles, finishes, and structural requirements.
- B. On-Site Fabrication: Fabricate metal panels on-site using manufacturer-approved portable roll-forming equipment. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved shop drawings.
- D. In-Seam Sealant: For panels installed at slopes less than 2 in 12, furnish panels with manufacturer's approved continuous joint sealant or hot melt sealant in panel seams.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with roof panel manufacturer's recommended profiles, approved shop drawings, and Project drawings. Form from materials matching metal panel substrate and finish.

2.9 FINISHES

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Steel Panels and Accessories:

Specifier: SMI's fluoropolymer coatings are based on Arkema, Inc. Kynar 500 and furnished by Sherwin Williams. SMI recommends a two-coat system for most applications; for circumstances where added abrasion resistance is required, a three-coat system is available; consult an SMI representative. Note: If designing with Non-painted Galvalume or Aluminum, delete Paragraph B.

1. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
2. Three-Coat Fluoropolymer: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat and 0.5 mil 70 percent PVDF fluoropolymer clear topcoat, AAMA 621.
3. Interior Finish: 0.5 mil total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.

C. Aluminum Panels and Accessories:

Specifier: SMI's fluoropolymer coatings are based on Arkema, Inc. Kynar 500 and furnished by Sherwin Williams. SMI recommends a two-coat system for most applications; for circumstances where added abrasion resistance is required, a three-coat system is available; consult an SMI representative.

1. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 2605.
2. Fluoropolymer Three-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat and 0.5 mil 70 percent PVDF fluoropolymer clear topcoat, AAMA 2605.
3. Interior Finish: 0.5 mil total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine metal roof panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions affecting metal panel installation.
 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal roof panels.
 2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal roof panel system manufacturer.
- B. Examine roughing-in for items penetrating metal panels to verify actual locations of penetrations properly located in relation to seam locations of metal panels.
- C. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal panel system installation.

3.2 PREPARATION

- A. Substrate Board: Install substrate boards over roof substrate on entire roof surface. Attach with substrate-board fasteners.

1. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
2. Comply with requirements for fire-rated construction.

- B. Flashings: Provide flashings as required to complete metal roof panel system. Install in accordance with Division 07 section "Sheet Metal Flashing and Trim" and approved shop drawings.

3.3 UNDERLAYMENT INSTALLATION

- A. Sheet Underlayment: Comply with installation requirements of underlayment manufacturer. Apply over entire roof surface, wrinkle free, in shingle fashion to shed water. Cover underlayment within specified period.

3.4 METAL PANEL INSTALLATION

- A. Standing Seam Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, assuring that the roof is square, straight, flat and in-plane. Anchor panels and other components securely in place. Provide for thermal and structural movement.

- B. Attach panels to supports using clips, screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.

1. Fasten metal panels to plywood deck with concealed panel clips, fasteners, and insulation plates at each location indicated on approved shop drawings, with spacing and fasteners indicated.
2. Seamed Joint: Lap female side of panel over clip and male side of panel. Hand seam panels 90 degrees at clip locations and then use manufacturer-approved, motorized seamer so that clip and metal roof panel are completely engaged to a full 180 degrees.
3. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

3.5 ACCESSORY INSTALLATION

- A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
3. Provide concealed fasteners except where noted on approved shop drawings.
4. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

- B. Install flashings to comply with metal roof panel manufacturer's and requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."

- C. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.
 - 1. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."
- D. Pipe Flashing: Form flashing around pipe penetration. Fasten and seal to metal roof panels as recommended by metal panel manufacturer.
- E. Gutters: Join sections with riveted and soldered or lapped, riveted, and sealed joints. Attach gutters as indicated on approved shop drawings. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- F. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners and terminate at bottom of downspout as indicated on approved shop drawings
- G. Roof Curbs: Refer to Division 07 section "Roof Accessories." Install pre-manufactured curbs at locations indicated on approved shop drawings. Install curbs where they meet metal roof panels as per metal roof panel manufacturer's written instructions.
- H. Snow Guards: Refer to Division 07 section "Snow Guards." Attach snow guards to vertical ribs of standing seam metal roof panels with clamps or set screws in array recommended by snow guard manufacturer. Do not use fasteners that will penetrate metal roof panels.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION