SECTION 07 40 00
ROOFING AND SIDING PANELS

SPEC WRITER NOTE: Delete between //____// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION
This section specifies // insulated // uninsulated // metal wall and roof panels // and fire rated composite metal wall and roof systems // as shown.

1.2 RELATED WORK
A. Sealant: Section 07 92 00, JOINT SEALANTS.
B. Color and texture of finish: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 MANUFACTURER'S QUALIFICATIONS
Metal wall and roof panels // and composite metal wall and roof systems // shall be products of a manufacturer regularly engaged in the fabrication and erection of metal panels // and composite metal wall and roof systems // of the type and design shown and specified.

1.4 FIRE RATING
Composite metal wall // and roof // systems shall have a fire rating of _____ hours when tested in accordance with ASTM E119.

1.5 SUBMITTALS
A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Samples: Metal panel, 150 mm (six inch) square, showing finish, each color and texture.
C. Shop Drawings: Wall and roof panels, showing details of construction and installation. // Collateral steel framing // U value // thickness and kind of material, closures, flashing, fastenings and related components and accessories.
D. Manufacturer's Literature and Data: Wall and roof panels
E. Fire Test Report: Report of fire test by recognized testing laboratory for fire rating specified, showing details of construction.

1.6 APPLICABLE PUBLICATIONS
A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
B. American Society for Testing and Materials (ASTM):

A653/A653M-10 .......... Steel Sheet, Zinc-Coated (Galvanized), or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

A463-10 ............... Steel Sheet, Cold-Rolled, Aluminum-Coated, by the Hot-Dip Process

A924/A924M-10 ........ Steel Sheet, Metallic Coated by the Hot-Dip Process

A1008/A1008M-10 ....... Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy

B209/209M-07 .......... Aluminum and Aluminum Alloy Sheet and Plate

C1396-11 ............... Standard Specification for Gypsum Board

C553-08 ............... Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications

C591-09. ............... Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

C612-10 ............... Mineral Fiber Block and Board Thermal Insulation

E119-10 ............... Fire Test of Building Construction and Materials

PART 2 - PRODUCTS

SPEC WRITER NOTE: Make material requirements agree with applicable requirements specified in the referenced Applicable Publications. Update and specify only that which applies to the project.

2.1 SHEET STEEL

A. Minimum 0.8mm thick for wall and roof panels.

B. Steel, Sheet, Galvanized: ASTM A653/A653M, Structural.
   1. Grade 40, galvanized coating conforming to ASTM A924/A924M, Class Z 275 G-90.

C. Steel, Sheet, Commercial: ASTM A1008, Type C.

D. Steel, Sheet, Aluminized: ASTM A463. Steel shall be coated on both sides with 0.5 ounce of aluminum per square foot (0.15 Kg/sm ).

2.2 ALUMINUM PLATE AND SHEET

ASTM B209/209M

2.3 FASTENERS

//Fasteners for steel panels shall be galvanized or cadmium plated steel. //
//Fasteners for aluminum panels shall be aluminum or stainless steel. //
// Fasteners of size, type and holding strength as recommended by manufacturer. //

2.4 GYPSUM BACKING BOARD
ASTM C1396, Type X, Plain face, Square edge.

2.5 THERMAL INSULATING MATERIALS
A. Urethane or isocyanurate Board: ASTM C591, Type I.
B. Mineral Fiber Blankets: ASTM C553, Type I.
C. Mineral Fiber Board: ASTM C612, Class I.

2.6 FABRICATION
A. Insulated metal wall and roof panels shall consist of an insulating core enclosed between two metal face sheets, of configuration shown on drawings. Construct panels by pressing members together to form a structural unit with closed ends. Furnish Wall panels in one continuous length for full height, or at least one story height with no horizontal joints, except at openings. Overall thickness of panels is shown on drawings. Connection between panels shall be by // interlocking male and female joints // interlocking joints filled with sealant. // Work shall include // collateral steel framing // metal and bituminous closures, fastenings, flashing, clip, caulking, // panel reinforcements for support of mechanical and electrical work shown on drawings, // and related components and accessories. Construct panels as follows:

1. Exterior face of wall or roof sheet:
   a. // 0.8 // 1.0 // 1.25 // mm (// 0.032 // 0.040 // 0.050 // inch) thick aluminum.
   b. // 1.2 // 0.9 // 0.6 // 0.5 // mm (// 0.0478 // 0.0359 // 0.0229 // 0.0239 // inch) thick uncoated steel.
   c. // 1.3 // 1.0 // 0.85 // 0.7 // 0.6 // mm (// 0.0516 // 0.0396 // 0.0336 // 0.0276 // 0.0247 // inch) thick galvanized steel.
   d. 0.8 mm (0.032 inch) thick aluminized steel.

2. Interior liner face of wall or roof sheet:
   a. // 0.8 // 1.0 // 1.25 // mm (// 0.032 // 0.040 // 0.050 // inch) thick aluminum.
   b. // 1.3 // 1.0 // 0.85 // 0.7 // 0.6 // mm (// 0.0516 // 0.0396 // 0.0336 // 0.0276 // 0.0247 // inch) thick galvanized steel.
   c. // 1.2 // 0.9 // 0.6 // 0.5 // mm (// 0.0478 // 0.0359 // 0.0229 // 0.0239 // inch) thick uncoated steel.

SPEC WRITER NOTE: Verify use of urethane or isocyanurate insulation in VA hospital patient and other public areas.
3. Insulation shall be urethane board / isocyanurate / mineral fiber blanket / having a "U" value of 0.85 / 1.2 / ___ W/(m²•K) / 0.15 / 0.21 / ____ Btu/[h•ft²•°F].

4. Sub-girts shall be 1.0 mm (0.0396 inches) thick galvanized steel hat channels designed to receive panel fasteners or clips.

5. Accessories and fastenings shall be the same material and finish as the panels. Thickness and installation of accessories and flashing shall be as recommended by panel manufacturer.

B. Uninsulated metal wall and roof panels shall be single sheets, of approximate overall depth and configuration shown on drawings.

Connection between panels shall be by interlocking joints filled with sealing compound as specified in Section 07 92 00, JOINT SEALANTS.

Furnish wall panels in one continuous length for full height or at least one story height with no horizontal joints, except at openings.

Furnish roof panels in one continuous length of roof span and provide cut-outs as required for passage of pipes, conduits, vents and the like. Construct panels as follows:

1. Wall panels:
   a. 0.8 / 1.0 / mm (0.032 / 0.040 / inch) thick aluminum.
   b. 1.3 / 1.0 / 0.85 / 0.7 / mm (0.0516 / 0.0396 / 0.0336 / 0.0276 / inch) thick galvanized steel.
   c. 1.2 / 0.9 / 0.6 / mm (0.0478 / 0.0359 / 0.0229 / inch) thick uncoated steel.
   d. 0.8 / 1.0 / mm (0.032 / 0.040 / inch) thick aluminized steel.

2. Roof Panels:
   a. 0.8 / 1.0 / mm (0.032 / 0.040 / inch) thick aluminum.
   b. 1.3 / 1.0 / 0.85 / 0.7 / mm (0.0516 / 0.0396 / 0.0336 / 0.0276 / inch) thick galvanized steel.
   c. 1.2 / 0.9 / 0.6 / 0.5 / mm (0.0478 / 0.0359 / 0.0229 / 0.0239 / inch) thick uncoated steel.
   d. 0.8 / 1.25 / mm (0.032 / 0.050 / inch) thick aluminized steel.

3. Accessories and flashing shall be the same material as the panels. Thickness and installation of accessories and flashing shall be as recommended by the panel manufacturer.

C. Composite metal wall system shall consist of exterior face sheet, sub-girts, gypsum backing board panels and insulated interior liner sheet.

Furnish wall system in one continuous length for full height with no horizontal joints, except at openings. Thickness of wall system is shown on the drawings. Provide connection between panels with joints.
filled with sealant specified in Section 07 92 00, JOINT SEALANTS. Seal joints between related components as required to make the work watertight. Work for wall system shall include steel framing members, insulation, gypsum backing board, louvers and frames, door frames, closures, fastenings, flashings, coping clips, caulking, reinforcements for support of mechanical and electrical work shown on drawings, steel angles at curbs and beams, vertical steel angles at existing building and all related components and accessories. Construct wall system as follows:

1. Exterior face sheet of 0.9 mm (0.0359 inch) thick sheet steel of indicated configuration and pattern.
2. Gypsum backing board panels. Gypsum backing board shall be of the same type for each layer.
3. Interior liner sheet of 0.7 mm (0.0276 inch) thick galvanized sheet steel of flush pattern.
4. Insulation shall be mineral blankets installed on interior face of liner sheet.
5. Fabricate wall louvers and frames of same material, thickness and finish as exterior face sheets of wall system. Louver assembly shall be designed and installed to prevent infiltration of water into structure.
6. Construct roof system as follows:
   a. Exterior face sheet of 0.9 mm (0.0359 inch) thick sheet steel of indicated configuration and pattern.
   b. Interior liner sheet of 0.7 mm (0.0276 inch) thick galvanized sheet steel of flush pattern.
   c. Insulation shall be mineral blankets installed on interior face of liner sheet.
7. Composite wall and roof system shall have Underwriters Laboratories, Inc., or other nationally recognized laboratory label for required fire rating indicated in paragraph 1.4.

SPEC WRITER NOTE: On small projects, delete numerical aluminum finish designation and use descriptive designation.

2.7 FINISH

A. For insulated and uninsulated wall and roof panels // and composite wall and roof panels //, the finishes shall be as follows for aluminum face sheets:

//1. AA-RlX finish Fluoropolymer enamel finish, consisting of a chemical pre-treatment of the base aluminum; then applying a primer coat of
0.1 to 0.4 mil dry film thickness; a polyvinylidene fluoride resin finish coat of 0.8 mil minimum dry film thickness on one side, and a wash coat of 0.3 to 0.4 mil minimum dry film thickness applied to reverse side. //

//2. AA-R2X finish - Baked-on enamel finish, consisting of a chemical pre-treatment of the base aluminum; then applying a primer coat and a protective coat applied to reverse side. //

//3. AA-R3X finish - Acrylic film finish, consisting of an acrylic primer in solid film formed of two to three mil thickness bonded to the base aluminum. //

//4. AA-M10C22A31 finish - (Unspecified) as fabricated, chemically etched medium matte finish, clear anodized 0.4 mil thick. //

//5. AA-M10C22A41 finish - (Unspecified) as fabricated, chemically etched medium matte finish, clear anodized 0.7 mil thick. //

//6. AA-M10C22A32 finish - (Unspecified) as fabricated, chemically etched medium matte finish, integral color anodized 0.4 mil thick. //

//7. AA-M10C22A42 finish - (Unspecified) as fabricated, chemically etched medium matte finish, integral color anodized 0.7 mil thick. //

//8. AA-M10 finish - (Unspecified) as fabricated // and field painted // for interior liner face sheet for insulated wall panels. //

B. For steel face sheets, the finishes shall be as follows:

//1. Silicone polyester finish, consisting of a chemical pre-treatment of the galvanized steel // or uncoated steel //, then applying an epoxy prime coat of 0.2 mil minimum dry film thickness; then a silicone polyester finish coat of 0.8 mil minimum dry film thickness on one side and polyester prime coat of 0.5 mil minimum dry film thickness applied to reverse side. //

//2. Acrylic film finish, consisting of an acrylic polymer in solid film formed of two to three mil thickness bonded to the galvanized steel // or uncoated steel //.

//3. Vinyl coated finish, consisting of a chemical pre-treatment of the galvanized steel // or uncoated steel //, then applying a vinyl resin prime and finish coats. Dry film thickness shall be 1.50 to 1.75 mil on each side. //

//4. Fluorocarbon finish, consisting of a prime coat and a polyvinylidene fluoride finish coat of 1.0 mil minimum dry film thickness on one side, and a wash coat of 0.5 mil minimum dry film thickness applied to reverse side. //

//5. Baked-on enamel prime coat 0.5 mil thick for steel interior liner face sheet for insulated wall panels. //
C. Finish numbers for aluminum specified herein are in accordance with The Aluminum Association's Designation System. Each aluminum finish number preceded by letters AA identifies it as an Aluminum Association designation.

D. Aluminum alloy used for color coating shall be as required to produce specified color. Color shall be as specified in Section 09 06 00, SCHEDULE FOR FINISHES. Color for sheet aluminum shall not deviate more than the colors of extrusion samples.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install panels in accordance with the manufacturer's approved erection instructions and diagrams, except as specified otherwise. Panels shall be in full and firm contact with supports and with each other at side and end laps. Where panels are cut in the field, or where any of the factory applied coverings or coatings are abraded or damaged in handling or installation, they shall, after the necessary repairs have been made with material of the same type and color as the weather coating, be approved before being installed. All cut ends and edges, including those at openings through the sheets shall be sealed completely. Correct defects or errors in the materials in an approved manner. Replace materials which cannot be corrected in an approved manner with nondefective material. Provide molded closure strips where indicated and whenever sheets terminate with open ends after installation.

B. Wall Panels: Apply panels with the configuration in a vertical position. Provide panels in the longest obtainable lengths, with end laps occurring only at structural members full heights from base to eave with no horizontal joints except at the junctions of door frames, window frames, louver panels, and similar locations. Seal side and end laps with joint sealing material. Flash and seal walls at the base, at the top, around windows, door frames, framed louvers, and other similar openings. Install closure strips, flashings, and sealing material in an approved manner that will assure complete weather tightness. Flashing will not be required where approved "self-flashing" panels are used.

C. Roof Panels: Apply roofing panels with the configurations parallel to the slope of the roof. Provide roofing panels in the longest lengths obtainable, with end laps occurring only at structural members full lengths from ridge (or ridge panel) to eaves top to eaves on shed roofs, with no transverse joints except at the junction of ventilators, curbs, skylights, chimneys and similar openings. Lay
all side laps away from the prevailing wind, and seal side and end laps with joint sealing material. Flash and seal the roof at the ridge, at eaves and rakes, at projections through the roof, and elsewhere as necessary. Install closure strips, flashing, and sealing material in an approved manner that will assure complete weather tightness.

D. Flashing: All flashing and related closures and accessories in connection with the preformed metal panels shall be provided as indicated and as necessary to provide a watertight installation. Details of installation, which are not indicated, shall be in accordance with the panel manufacturer's printed instruction and details, or the approved shop drawings. Installation shall allow for expansion and contraction of flashing.

E. Fasteners: Fastener spacings shall be in accordance with the manufacturer's recommendations, and as necessary to withstand the design loads indicated. Install fasteners in valleys or crowns as recommended by the manufacturer of the sheet being used. Install fasteners in straight lines within a tolerance of 13 mm (1/2-inch) in the length of a bay. Drive exposed penetrating type fasteners normal to the surface, and to a uniform depth to seat gasketed washers properly, and drive so as not to damage factory applied coating. Exercise extreme care in drilling pilot holes for fastenings to keep drills perpendicular and centered in valleys, or crowns, as applicable. After drilling, remove metal filings and burrs from holes prior to installing fasteners and washers. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove panels deformed or otherwise damaged by over-torqued fastenings, and provide new panels. Remove metal shavings and filings from roofs on completion to prevent rusting and discoloration of the panels.

3.2 ISOLATION OF ALUMINUM

A. Isolate aluminum in contact with or fastened to dissimilar metals other than stainless steel, white bronze, or other metal compatible with aluminum by one of the following:
1. Painting the dissimilar metal with a prime coat of Zinc-Molybdate followed by two coats of aluminum paint.
2. Placing a non-abrasive tape or gasket between the aluminum and the dissimilar metal.

B. Paint aluminum in contact with or built into mortar, concrete, plaster, or other masonry materials with a coat of alkali-resistant bituminous paint.
C. Paint aluminum in contact with wood or other absorptive materials, that may become repeatedly wet, with two coats of bituminous paint, or two coats of aluminum paint. Seal joints with caulking material.

3.3 PROTECTION AND CLEANING

A. Protect panels and other components from damage during and after erection, and until project is accepted by the Government.

B. After completion of work, all exposed finished surfaces of panels shall be cleaned of soil, discoloration and disfiguration. Touch-up abraded surfaces of panels.

- - - E N D - - -