

SECTION 07 42 13

METAL WALL PANELS

04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA ADM1 (2005) Aluminum Design Manual

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG-973 (2002) Cold-Formed Steel Design Manual

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (2005) Minimum Design Loads for Buildings and Other Structures

ASTM INTERNATIONAL (ASTM)

ASTM A 653/A 653M (2006a) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A 755/A 755M (2006) Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products

ASTM A 792/A 792M (2006a) Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

ASTM B 209 (2006) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

ASTM D 1654 (2005) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D 2224 (1978; R 1983) Standard Test Method for Mean Molecular Weight of Mineral Insulating Oils by the Cryoscopic Method

ASTM D 2247 (2002) Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM D 2794 (1993; R 2004) Resistance of Organic

	Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(2002) Measuring Adhesion by Tape Test
ASTM D 4214	(1998) Evaluating the Degree of Chalking of Exterior Paint Films
ASTM D 4587	(2001) Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings
ASTM D 522	(1993a; R 2001) Mandrel Bend Test of Attached Organic Coatings
ASTM D 5894	(1996) Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
ASTM D 610	(2001) Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D 714	(2002e1) Evaluating Degree of Blistering of Paints
ASTM D 968	(2005) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM E 84	(2007) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM G 154	(2000ae1) Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

## 1.2 DESCRIPTION OF WALL PANEL SYSTEM

Factory color finished, galvanized metal wall panel system with concealed fastening attachment. Panel profile shall be as shown on drawings.

## 1.3 GENERAL DESIGN REQUIREMENTS

Criteria, loading combinations, and definitions shall be in accordance with ASCE 7. Maximum calculated fiber stress shall not exceed the allowable value in the AISI or AA manuals; a one third overstress for wind is allowed. Midspan deflection under maximum design loads shall be limited to L/180. Contract drawings show the design wind loads and the extent and general assembly details of the metal siding. Members and connections not shown on the drawings shall be designed by the Contractor. Siding panels and accessories shall be the products of the same manufacturer. Steel siding design shall be in accordance with AISI SG-973. Aluminum siding design shall be in accordance with AA ADM1.

## 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Siding; G, AE

Drawings consisting of catalog cuts, panel configuration, system assembly, attachment details, flashing details, design and erection drawings, shop coating and finishing specifications, and other data as necessary to clearly describe design, materials, sizes, layouts, construction details, fasteners, and erection. Drawings shall be accompanied by engineering design calculations for the siding panels. Drawings shall be approved by the metal wall panel manufacturer prior to submission.

SD-03 Product Data

Wall panels; G, AE

Closures

flashing

Accessories

Fasteners

Gaskets and Insulating Compounds

SD-04 Samples

WALL PANEL;

One piece of each type and finish (exterior and interior) to be used, 9 inches long, full width.

Factory-applied Color Finish Charts; G, AE

Provide standard color charts for wall panel and accessory color selection.

Accessories;

One sample of each type of flashing, trim, closure, cap and similar items. Size shall be sufficient to show construction and configuration.

Fasteners;

Two samples of each type to be used with statement regarding intended use. If so requested, random samples of bolts, nuts, and washers as delivered to the jobsite shall be taken in the presence of the Contracting Officer and provided to the Contracting Officer for testing to establish compliance with specified requirements.

Insulation;

One piece of each type to be used, and descriptive data covering installation.

Gaskets and Insulating Compounds;

Two samples of each type to be used and descriptive data.

Sealant;

One sample, approximately 1 pound , and descriptive data.

Wall Liners;

One piece, 9 inches long , full width.

#### SD-05 Design Data

Wind load calculations; G, AE

Calculations shall be prepared, signed, and sealed by a registered structural engineer.

#### SD-06 Test Reports

Salt Spray Test;

#### SD-07 Certificates

Wall Panels; G, AE

Accessories;

Certificates from the wall panel manufacturer attesting that the panels and accessories conform to the specified requirements and are suitable for the installation environment.

#### SD-08 Manufacturer's Instructions

INSTALLATION; G, AE

Submit manufacturer's printed installation manual and instructions.

### 1.5 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle panel materials, bulk products, accessories, and other manufactured items in a manner to prevent damage and deformation, as recommended by the manufacturer, and as specified.

#### 1.5.1 Delivery

Deliver materials to the site in dry and undamaged condition. Provide adequate packaging to protect materials during shipment. Crated materials shall not be uncrated until ready for use, except for inspection. Immediately upon arrival of materials at jobsite, inspect materials for damage, deformation, dampness, and staining. Remove affected materials from the site. Remove moisture from wet materials not otherwise affected, restack and protect from further moisture exposure.

### 1.5.2 Storage

Stack materials stored on site on platforms or pallets, and cover with tarpaulins or other weathertight covering which prevents trapping of water or condensation under the covering. Store wall panels so that water which may have accumulated during transit or storage will drain off. Do not store panels in contact with materials that might cause staining. Storage accommodations for metal wall panels shall provide good air circulation and protection from surface staining. Secure coverings and stored items to protect from wind displacement.

### 1.5.3 Handling

Handle materials in a manner to avoid damage. Select and operate material handling equipment so as not to damage materials or installation.

### 1.6 WARRANTIES

The Contractor shall provide a weathertight material and workmanship warranty for the metal wall panel system installation for a period of 20 years and to include a manufacturer's 10 year warranty against cracking, peeling, or delamination of the color finish and corrosion of the base metal, and 10 year warranty against the corrosion of fasteners caused by ordinary wear and tear by the elements. The warranties shall start upon final acceptance of the work or the date the Government takes possession, whichever is earlier.

## PART 2 PRODUCTS

### 2.1 WALL PANEL

Panels shall be steel or aluminum and shall have a factory-applied color finish. Panel profile shall be as shown on drawings. Wall panels shall have edge configurations for overlapping adjacent sheets or interlocking ribs for securing adjacent sheets. Width of sheets with overlapping configurations shall provide not less than 24 inches of coverage in place, and those with interlocking ribs shall provide not less than 12 inches of coverage in place. Wall panels shall be fastened to framework using concealed fasteners. Length of panels shall be sufficient to cover the entire height of any unbroken wall surface when length of run is 30 feet or less. When length of run exceeds 30 feet, each sheet in the run shall extend over two or more spans. Sheets longer than 30 feet may be furnished if approved by the Contracting Officer. Panels shall be formed without warping, waviness, or ripples that are not a part of the panel profile and shall be free of damage to the finish coating system.

#### 2.1.1 Steel Panels

Zinc-coated steel conforming to ASTM A 653/A 653M, Structural Grade 40 and minimum G90 galvanized smooth metallic coating; aluminum-zinc alloy coated steel conforming to ASTM A 792/A 792M, AZ 55 coating. Prepainted steel sheet shall also comply with ASTM A 755/A 755M. Wall panel material shall be minimum 12 gage thick prior to coating application. Panels shall be within 95 percent of the nominal thickness. Prior to shipment, mill finish panels shall be treated with a passivating chemical and oiled to inhibit the formation of oxide corrosion products. Panels that have become wet during shipment and have started to oxidize shall be rejected.

### 2.1.2 Aluminum Panels

Alloy 3003 or 3004 conforming to ASTM B 209, temper as required for the forming operation; minimum 1.0 mm (0.040 inch) thick, and as required to meet wind load requirements.

### 2.1.3 Factory Insulated Panels

Insulated wall panels shall be factory-fabricated units with insulating core between metal face sheets, securely fastened together and uniformly separated with rigid spacers; facing of steel and aluminum of composition and gauge specified for wall panels; and constructed to eliminate condensation on interior of the panel. The inner face of the insulated panel shall be 12 gauge steel. The outer face shall be aluminum. Panels shall be 2 inches thick. Panels shall have a factory-applied color finish.

Insulation shall provide an R-value of 11; be compatible with adjoining materials; nonrunning and nonsettling; capable of retaining its R-value for the life of the metal facing sheets; and unaffected by extremes of temperature and humidity. The assembly shall have a flame spread rating not higher than 25, and smoke developed rating not higher than 50 when tested in accordance with ASTM E 84. The insulation shall remain odorless, free from mold, and not become a source of food and shelter for insects. Panels shall be not less than 8 inches wide and shall be in one piece for unbroken wall heights.

## 2.2 FACTORY COLOR FINISH

Panels shall have a factory applied 70 percent polyvinylidene fluoride (PVDF2) finish on the exposed side. The exterior finish shall consist of a baked-on finish coat with an appropriate prime coat. Total color coating system thickness shall be not less than 0.025 mm (1 mil) and with any additional primer and finish coat thickness required to meet the color finish performance requirements specified. Provide manufacturer's standard factory-applied clear coat system over color finish coat. The exterior coating shall be a nominal 1 mil thickness consisting of a topcoat of not less than 0.02 mm (0.75 mil) dry film thickness and the paint manufacturer's recommended primer of not less than 0.005 mm (0.2 mil) thickness. Provide manufacturer's standard factory-applied clear coat system over color finish coat on the exterior side. The interior color finish shall consist of a nominal 1 mil thick PVDF finish otherwise the same as the exterior. Finish coat color shall white. The exterior color finish shall meet the performance requirements specified.

### 2.2.1 Salt Spray Test

A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 2014 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; no rusting, as determined by ASTM D 610; and a rating of 7, less than 1.5 mm (1/16 inch) creepage from scribe as determined by ASTM D 1654.

### 2.2.2 Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 1/8 inch diameter mandrel, the coating film shall show no evidence of fracturing to the naked eye.

### 2.2.3 Accelerated Weathering, Chalking Resistance and Color Change

Coating sample shall withstand weathering test of 5000 hours , in accordance with ASTM D 4587 and ASTM G 154, Type D using without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating with an adhesion rating of less than 4B when tested in accordance with ASTM D 3359, Test Method B, shall be considered as an area indicating loss of adhesion. Following the accelerated weathering test, the coating shall have a chalk rating not less than No. 8 in accordance with ASTM D 4214 test procedures, and the color change shall not exceed 5 CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2224.

### 2.2.4 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

### 2.2.5 Impact Resistance

Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 13 mm (0.50 inch) diameter hemispherical head indenter, equal to 1.5 times the metal thickness in mils, expressed in inch-pounds, with no loss of adhesion.

### 2.2.6 Abrasion Resistance Test

When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 50 liters of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.

### 2.2.7 Factory-Applied Finish

Coordinate factory-applied finish is acceptable as base for spray-applied fireproofing.

## 2.3 ACCESSORIES

Flashing, trim, metal closure strips, caps, and similar metal accessories shall be the manufacturer's standard products. Exposed metal accessories shall be finished to match the panels furnished. Molded closure strips shall be bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chlorided premolded to match configuration of the panels and shall not absorb or retain water.

## 2.4 FASTENERS

Fasteners for steel panels shall be zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for aluminum panels shall be aluminum or corrosion resisting steel. Fasteners for attaching wall panels to supports shall provide both tensile and shear strength of not less than 750 pounds per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed wall fasteners shall be color finished or provided with plastic color caps to match the panels. Nonpenetrating fastener system for wall panels using concealed clips shall be manufacturer's standard for the system provided.

#### 2.4.1 Screws

Screws shall be as recommended by the manufacturer.

#### 2.4.2 End-Welded Studs

Automatic end-welded studs shall be shouldered type with a shank diameter of not less than 3/16 inch and cap or nut for holding panels against the shoulder.

#### 2.4.3 Explosive Actuated Fasteners

Fasteners for use with explosive actuated tools shall have a shank of not less than 0.145 inch with a shank length of not less than 1/2 inch for fastening panels to steel and not less than 1 inch for fastening panels to concrete.

#### 2.4.4 Blind Rivets

Blind rivets shall be aluminum with 3/16 inch nominal diameter shank or stainless steel with 1/8 inch nominal diameter shank. Rivets shall be threaded stem type if used for other than the fastening of trim. Rivets with hollow stems shall have closed ends.

#### 2.4.5 Bolts

Bolts shall be not less than 1/4 inch diameter, shouldered or plain shank as required, with proper nuts.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Installation shall meet specified requirements and be in accordance with the manufacturer's installation instructions and approved shop drawings. Correct defects or errors in materials and installation. Do not install damaged materials. Dissimilar materials which are not compatible when contacting each other shall be insulated from each other by means of gaskets or insulating compounds. Improper or mislocated drill holes shall be plugged with an oversize screw fastener and gasketed washer; however, panels with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces and edges shall be kept clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Stained, discolored, or damaged materials shall be removed from the site.

##### 3.1.1 Wall Panels and Accessories

Wall panels shall be applied with the longitudinal configurations in the vertical position. Provide panels in full wall heights from base to eave with no horizontal joints except at junctions of door frames and similar locations. Minimum end laps for panels shall be 50 mm (2 inches) and shall occur only over girt and structural members. Side laps shall be standard overlap or interlocking ribs based on manufacturer's standard. Seal side and end laps with joint-sealing material. Flash wall panels at base and at top, around windows, door frames, framed louvers, and other similar openings. Place closures, flashing, and sealing materials to achieve complete water tightness. Flashing is not required where approved

interlocking, concealed-type side joints with concealed fasteners for wall panels are used. Accessories shall be fastened into framing members, except as otherwise approved. Closure strips shall be provided as indicated and where necessary to provide weathertight construction.

#### 3.1.1.1 Lap Type Panels with Exposed Fasteners

End laps shall be made over framing members with fasteners into framing members approximately 50 mm (2 inches) from the end of the overlapping sheet. Side laps shall be laid away from the prevailing winds. Spacing of fasteners shall present an orderly appearance and shall not exceed: 200 mm (8 inches) on center at end laps of wall panels, 200 mm (8 inches) on center at connection of panels to intermediate supports, and 450 mm (18 inches) on center at side laps of panels except when otherwise recommended by the panel manufacturer and approved by the Contracting Officer. Side and end laps of wall panels and joints at accessories shall be sealed. Fasteners shall be installed in straight lines within a tolerance of 50 mm (1/2 inch) in the length of a bay. Fasteners shall be driven normal to the surface and to a uniform depth to seat the gasketed washers properly.

#### 3.1.1.2 Concealed Fastener Wall Panels

Panels shall be fastened to framing members with concealed fastening clips or other concealed devices standard with the manufacturer. Spacing of fastening clips and fasteners shall be in accordance with the manufacturer's written instructions. Spacing of fasteners and anchor clips along the panel interlocking ribs shall not exceed 300 mm (12 inches) on center except when otherwise recommended by the panel manufacturer and approved by the Contracting Officer. Fasteners shall not puncture metal sheets except as approved for flashing, closures, and trim; exposed fasteners shall be installed in straight lines. Interlocking ribs shall be sealed with factory-applied sealant. Joints at accessories shall be sealed.

### 3.2 CLEAN UP AND FINISH TOUCH-UP

Clean exposed sheet metal work at completion of installation. Remove metal shavings and filings. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces shall be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating. Touch up scratches in panel finish with manufacturer supplied touch-up paint system to match panel finish. Treat exposed cut edges with manufacturer supplied clear coat.

### 3.3 CORRECTION OF DEFICIENCIES

Where any form of deficiency is found, additional measures shall be taken as deemed necessary by the Contracting Officer to determine the extent of the deficiency and corrective actions shall be as directed by the Contracting Officer.

### 3.4 FIELD QUALITY CONTROL

#### 3.4.1 Construction Monitoring

Contractor shall make visual inspections as necessary to ensure compliance with specified requirements. Additionally, verify the following:

Materials comply with the specified requirements.

All materials are properly stored, handled and protected from damage. Damaged materials are removed from the site.

Framing and substrates are in acceptable condition, in compliance with specification, prior to application of wall panels.

Panels are installed without buckles, ripples, or waves and in uniform alignment and modulus.

Side laps are formed, sealed, fastened or seam locked as required.

The proper number, type, and spacing of attachment clips and fasteners are installed.

Installer adheres to specified and detailed application parameters.

Associated flashings and sheet metal are installed in a timely manner in accord with the specified requirements.

-- End of Section --