

**SECTION 13 34 19**  
**METAL BUILDING SYSTEMS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section covers materials, labor and equipment required to complete the pre-engineered metal building shown and specified: SHUTTLE BUS SHELTER.

**1.2 RELATED WORK**

- A. Concrete curbs and foundations: Section 03 30 00, CAST-IN-PLACE CONCRETE.

**1.3 MANUFACTURERS QUALIFICATIONS**

- A. Approval by Contracting Officer is required of products or service of proposed manufacturer, suppliers and installers, and will be based upon submission by Contractor of certification that:
- B. Manufacturer regularly and presently manufactures pre-engineered metal buildings as specified as one of its principal products.
- C. Installer has technical qualifications, experience, trained personnel and facilities to install specified items. Approval will not be given, however, where experience record is one of unsatisfactory performance.
- D. Manufacturer's product submitted has been in satisfactory and efficient operation on three installations similar and equivalent to this project for three years. Submit list of installations.

**1.4 DESIGN CRITERIA**

- A. Design metal buildings to resist the dead load, the live load, and the combination of these loads as set forth in Metal Building Manufacturers Association (MBMA) "Recommended Design Practices Manual":
1. Roof Live Load: 200 Kg/m<sup>2</sup> (40 pounds per square foot) applied on horizontal projection of roof structure.
  2. Wind Load: 150 Kg/m<sup>2</sup> (30 pounds per square foot) pressure.
- B. Deflection Limits (Live and Wind Loads Only):
1. Roof Framing: L/270.
  2. Roof Panels: L/180.
  3. Walls Panels: L/180., where L = Span length.
- C. Metal Building components shall be capable of supporting design loads without permanent deformation, loss of watertightness, or disengagement of any part of installation.

- D. Structural steel sections shall be designed in accordance with AISC, "Specification for Structural Steel Buildings". Light gage cold formed structural members shall be designed in accordance with latest edition of AISI, "Specifications for the Design of Light Gage Cold Formed Steel Structural Members". Welding shall comply with AWS Standard No. D1.1.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Samples: Wall and roof panels, 600 mm (24-inch) wide by 300 mm (12 inch) high sections, with factory finish in specified colors. Fasteners for panels
- C. Certificates:
1. Indicating manufacturers and installers meet qualifications specified.
- D. Manufacturer's Literature and Data: Manufacturer's data sheets on each product to be used, including:
1. Construction details, material descriptions, dimensions of individual components and profiles, full range of available standard colors and finishes.
  2. Preparation instructions and recommendations.
  3. Storage and handling requirements and recommendations.
  4. Installation methods.
- E. Shop Drawings: Shop drawings, erection drawings and erection manuals showing complete erection layouts, installation instructions, and details of connections. Details and layouts shall show the steel framing location, lengths, and markings of panels and other component parts to correspond with sequence and procedure for erection.
- F. Structural Design Analysis:
1. Furnish complete structural design analysis for all structural components of the prefabricated metal buildings.
  2. Provide manufacturer load tables indicating the selected panel material, configuration and thickness meets the design requirements for the spans shown.

#### **1.6 STORAGE AND PROTECTION**

Materials stored on site before erection shall be stacked and covered with suitable weather tight covering. Store metal panels so that any

accumulated water will drain off. Panels shall not be stored in contact with materials that cause staining. Materials having defects or damages that effect appearance, serviceability or use will be rejected.

#### 1.7 WARRANTY

Prefabricated metal building shall be warranty against defects in materials and workmanship, and that after erection completed work shall be weather tight and shall be subject to the terms of the "Warranty of Construction" Article in FAR clause 52.246-21, except that the warranty period shall be one year.

#### 1.8 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):
- A36/A36M-05.....Carbon Structural Steel.
  - A242/A242M-04(E2005)....High-Strength Low-Alloy Structural Steel.
  - A653/A653M-07.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron-alloy-Coated (Galvannealed) by the Hot-Dip Process
  - A1008/A1008M(REV A-07)..Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy
  - A1011/A1011M-07.....Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy
  - B117-07.....Standard Practice for Operating Salt Spray (Fog)
  - B209/209M-07.....Aluminum and Aluminum-Alloy Sheet and Plate
  - C553-02.....Specifications for Mineral Fiber Blanket Thermal Insulation for Commercial and Insulation for Commercial and Industrial Applications
  - C1036-06.....Flat glass
  - D522 REV A-93(R2001)....Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
  - D2244-07.....Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
  - D2794-93(R2004).....Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation

- D3359-02.....Standard Test Methods for Measuring Adhesion by  
Tape Test
- D4214-07.....Standard Test Methods for Evaluating the Degree  
of Chalking of Exterior Paint Films
- G153-04.....Standard Practice for Operating Enclosed Carbon  
Arc Light Apparatus for Exposure of Nonmetallic  
Materials
- C. Metal Building Manufacturers Association (MBMA):
1. Recommended Guide Specifications for Pre-Engineered Metal Buildings.
  2. Recommended Design Practices Manual.
- D. American Institute of Steel Construction (AISC): Document No. 360-05.  
Specifications for Structural Steel Buildings; Allowable Stress Design  
and Plastic Design (1989).
- E. National Fire Protection Association (NFPA), No. 220: Standard Types of  
Building Construction (2006)
- F. American Welding Society (AWS):
- D1.1/D1.1M-06.....Structural Welding Code.
- G. American Iron and Steel Institute (AISI):  
Light Gage Cold Formed Design Manual.
- H. Uniform Building Code, Latest Edition.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum: Alloy and Temper recommended by Manufacturer for Use and  
Finish specified, and as follows:
1. Sheet: ASTM B 209
  2. Extruded Shapes: ASTM B 221
  3. Rolled Tread Plate: ASTM 632/B 632M, Alloy 6061-T4 or 6061-T6.

### **2.2 FABRICATION**

- A. General: Coordinate fabrication and erection of work with related work  
of other trades. Provide cutouts and supplemental reinforcement as  
required to accommodate materials and work specified in other sections  
of the specifications.
- B. Protection of Dissimilar Metals: Dissimilar materials which are not  
compatible with adjoining materials when exposed to moisture shall be  
separated by means of coatings, gaskets, or other effective means.

C. Flashing, Trim And Closures: Same material, gage and finish as adjacent wall and roof panels. Fastenings shall be as specified for wall and roof panels. Form or mold closure strips to match configuration of the roofing or siding. Install closures wherever necessary to insure weather tight construction.

### 2.3 FACTORY FINISH AND PAINTING

- A. Wall and roof panels, including related components, accessories and fastenings, shall have approved factory finish as follows:
1. Finish on the weather face of wall and roof panels, and related components shall be a prime coat of epoxy primer with a finish coat of Polyvinylidene Fluoride baked on coating thickness of (0.8-1.3 mils) with the following performance characteristics.
    - a. Salt Spray Test: ASTM B 117, minimum (500) (1000) hours. Undercutting of the paint film from the score line shall not exceed 2 mm (1/16 inch).
    - b. Accelerated Weathering Test: ASTM G 153, Method 2, Type D apparatus minimum 2000 hours or Type EH apparatus minimum 500 hours, no checking, blistering or loss of adhesion; color change less than 5 NBS units by ASTM D 2244 and chalking less than No. 8 rating by ASTM D 4214.
    - c. Flexibility: ASTM D 522, Method A, 3 mm 1/8 inch diameter, 180 degree bend, no evidence of fracturing to the naked eye.
    - d. Adhesion: ASTM D 3359, Method B, for laboratory test and film thickness less than 0.01 mm 5 mil and Method A for site tests. There shall be no film removed by tape applied to 11 parallel cuts spaced 3 mm 1/8 inch apart plus 11 similar cuts at right angles.
    - e. Impact: ASTM D 2794, no loss of adhesion after direct and reverse impact equal to 1.5 times metal thickness in mm mils, expressed in m-kg inch-pounds.
- B. Field paint all exterior exposed fastenings to match adjacent panels.
- C. Abraded surfaces shall be wire-brushed and touched up with the same materials as the shop prime or finish coat of paint.
- D. For color of finish coat, to be selected by Contracting Officer's Representative (COR) from full range of manufacturers standard colors.

**PART 3 - EXECUTION****3.1 ERECTION**

- A. Bolt settings and other dimensions shall be held to a tolerance of plus or minus 3 mm (1/8-inch). Use templates or other gaging devices to assure accurate spacing of anchor bolts. Bolt field connections unless otherwise shown or specified.
1. Set accurately bases or sill members to obtain uniform bearing and maintain established floor line elevation. Anchors and anchor bolts for securing members to concrete curb shall be of black steel, set accurately to templates and of proper size to adequately resist applicable design loads at the base.
- B. Fasteners for Securing Roof and Wall Panels: Fastening method, size and spacing shall be as recommended by metal building manufacturer and as approved by COR. Fasteners shall be non-corrosive and of design that will produce a weathertight connection. Clearly show fasteners and fastening method on shop and erection drawings. Field paint exterior exposed fastenings to match adjacent panels as specified in paragraph, FACTORY FINISH AND PAINTING.
- C. Assemble and Install per shelter manufacturers recommendations.

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