

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

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. 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**

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

**1.2 RELATED WORK**

- A. Concrete curbs and foundations: Section 03 30 53, SHORT FORM CAST-IN-PLACE CONCRETE.
- B. Structural Steel: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- C. Doors and frames of a forced entry/ballistic resistant rated: Section 08 31 13, ACCESS DOORS AND FRAMES.
- D. Windows: Section 08 51 23, STEEL WINDOWS.
- E. Windows: Section 08 51 69.11, ALUMINUM STORM WINDOWS.
- F. Builders' Hardware: Section 08 71 00, DOOR HARDWARE.
- G. Color of panels, and other components: Section 09 06 00, SCHEDULE FOR FINISHES.
- H. Glazing and ballistic rated glazing: Section 08 80 00, GLAZING.
- I. Card readers and biometric devices: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
- J. Intrusion Alarm: Section 28 16 11, INTRUSION DETECTION SYSTEM.
- K. Perimeter fences and gates: Section 32 31 13, CHAINLINK FENCES AND GATES.

**1.3 MANUFACTURERS QUALIFICATIONS**

- A. Approval by COR is required of products or service of proposed manufacturer, suppliers and installers, and will be based upon submission by Contractor of certification that:
1. Manufacturer regularly and presently manufactures pre-engineered metal buildings as specified as one of its principal products.
  2. 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.

3. 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."
- B. Provide metal building components capable of supporting design loads and most critical effects of load factors and load combinations without permanent deformation, loss of water tightness, or disengagement of any part of installation; accommodate collateral loads.
- C. Design structural steel sections in accordance with AISC, "Specification for Structural Steel Buildings." Design light gage cold formed structural members in accordance with latest edition of AISI, "Specifications for the Design of Light Gage Cold Formed Steel Structural Members." Perform welding in compliance with AWS Standard No. D1.1.
- D. Deflection Limits: Engineer assemblies to withstand design loads with deflections no greater than the following:
1. Purlins and Rafters; vertical deflection of // 1/180 // // 1/240 // // \_\_\_\_\_ // of the span.
  2. Girts; horizontal deflection of // 1/180 // // 1/240 // // \_\_\_\_\_ // of the span.
  3. Metal Roof Panels; vertical deflection of // 1/180 // // 1/240 // // \_\_\_\_\_ // of the span.
  4. Metal Wall Panels; horizontal deflection of // 1/180 // // 1/240 // // \_\_\_\_\_ // of the span.
  5. Design secondary framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings. Provide metal panel assemblies capable of withstanding the effects of loads and stresses indicated.
- E. Seismic Performance: Design and engineer metal building system capable of withstanding the effects of earthquake motions determined according to AISC standards, and the applicable portions of the building code in the geographic area where the construction will take place.
- F. Thermal Performance: Provide insulated metal panel assemblies with the following maximum minimum R-values:
1. Metal Roof Panel Assemblies: Minimum R-Value // \_\_\_\_\_ //.

2. Metal Wall Panel Assemblies: Minimum R-Value // \_\_\_\_\_ //.

### 1.5 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // certified wood // \_\_\_\_\_// requirements.
- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.

### 1.6 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. Stating that the zinc coating on steel panels is the specified thickness.
  - 2. Stating that the thermal values of the roof and wall panels with insulation meet the specified requirements.
  - 3. Indicating manufacturers and installers meet qualifications specified.
- D. Manufacturer's Literature and Data:
  - 1. Metal Panels.
  - 2. Insulation.
  - 3. Sealing materials.
- E. Shop Drawings: Shop drawings, erection drawings and erection manuals showing complete erection layouts, installation instructions, and details of connections. Provide details and layouts that show the steel framing location, lengths, and markings of panels and other component parts to correspond with sequence and procedure for erection. Show connections with adjoining work.

SPEC WRITER NOTES:

- 1. Delete following if not applicable.

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.
3. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.

**1.7 PRE-INSTALLATION CONFERENCE**

- A. Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.

**1.8 STORAGE AND PROTECTION**

- A. Stack and cover materials stored on site before erection with suitable weather tight covering. Store metal panels so that any accumulated water will drain off. Do not store panels in contact with materials that cause staining. Materials having defects or damages that effect appearance, serviceability or use will be rejected.

**1.9 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

**1.10 WARRANTY**

- A. Warranty prefabricated metal building against defects in materials and workmanship and that, after erection completed work, to be weather tight. Warranty is subject to the terms of the "Warranty of Construction" Article in FAR clause 52.246-21, except that the warranty period to be //two// //ten// years.

**1.11 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic

designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

B. American Society for Testing and Materials (ASTM):

A36/A36M-19	Carbon Structural Steel
A153/A153M-16A	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A193/A193M -23	Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
A307-21	Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
A436-84R20	Austenitic Gray Iron Castings
A490-12	Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
A529/A529M-19	High-Strength Carbon-Manganese Steel of Structural Quality
A563-21e01	Carbon and Alloy Steel Nuts
A572/A572M-21e01	High-Strength Low-Alloy Columbium-Vanadium of Structural Steel
A653/A653M-M22	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
A792/A792M-M22	Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
A992/A992M-M22	Structural Steel Shapes
A1008/A1008M-21a	Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
A1011/A1011M-18a	Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-

- |                 |  |
|-----------------|--|
|                 | Strength Low-Alloy with Improved Formability,<br>and Ultra-High Strength |
| B209-21a        | Aluminum and Aluminum-Alloy Sheet and Plate                              |
| C920-18         | Elastomeric Joint Sealants   |
| E96/E96M 22Ae01 | Water Vapor Transmission of Materials                                    |
| F436-M19        | Hardened Steel Washers   |
| F844-19         | Washers, Steel, Plain (Flat), Unhardened for<br>General Use              |
| F1554-20        | Anchor Bolts, Steel, 36, 55, and 105-ksi Yield<br>Strength               |
- C. Metal Building Manufacturers Association (MBMA):  
Recommended Guide Specifications for Pre-Engineered Metal Buildings  
Recommended Design Practices Manual
- D. American Institute of Steel Construction (AISC), ANSI/AISC 360-10:  
Specifications for Structural Steel Buildings
- E. National Fire Protection Association (NFPA), No. 220: Standard Types of  
Building Construction (2012)
- F. American Welding Society (AWS):  
D1.1/D1.1M-08                      Structural Welding Code
- G. American Iron and Steel Institute (AISI):  
Light Gage Cold Formed Design Manual
- H. Society of Protective Coatings (SSPC)
- I. Sheet Metal and Air Conditioning Contractors National Association  
(SMACNA):  
Architectural Sheet Metal Manual 2012

## **PART 2 - PRODUCTS**

### **2.1 FRAMING MATERIALS**

#### SPEC WRITER NOTES:

1. Update material requirements to agree with applicable requirements (types, grades, classes, etc.) specified in the referenced Applicable Publications.
- A. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
- B. Miscellaneous Steel Framing and Structural Steel Members: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
- C. Sheet Aluminum: Conform to ASTM B209, alloy 3004.
- D. Sheet Steel:

1. Metallic Coated: ASTM A653/A653M with G40 zinc coating.
  2. Hot Rolled: ASTM A1011/A1011M, Grade 30-55.
  3. Cold Rolled: ASTM A1008/A1008M.
  4. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33 through 80 or High-Strength Low Alloy Steel (HSLAS), Grade 50 through 80, with G90 coating designation.
  5. Aluminum-Zinc Alloy Coated Steel Sheet: ASTM A792/A792M, Structural Steel (SS), grade 50 or 80, with Class AZ50 coating.
- E. Non-High-Strength Bolts, Nuts, and Washers:
1. ASTM A307, Grade A, carbon-steel, hex-head bolts; ASTM A563 carbon-steel hex nuts; and ASTM F844 plain (flat) steel washers.
  2. Finish: Plain.
- F. High-Strength Bolts, Nuts, and Washers:
1. ASTM A490, type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers, plain.
- G. Unheaded Anchor Rods:
1. ASTM F1554, Grade 36:
    - a. Configuration: Straight.
    - b. Nuts: ASTM A563 hex carbon steel.
    - c. Plate Washers: ASTM A36/A36M carbon steel.
    - d. Washers: ASTM F436 hardened carbon steel.
    - e. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.
- H. Headed Anchor Rods:
1. ASTM F1554, Grade 36, straight:
    - a. Nuts: ASTM A563 hex carbon steel.
    - b. Plate Washers: ASTM A36/A36M carbon steel.
    - c. Washers: ASTM A436 hardened carbon steel.
    - d. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.
- I. Threaded Rods:
1. ASTM A193/A193M:
    - a. Nuts: ASTM A563 hex carbon steel.
    - b. Washers: ASTM F436 hardened carbon steel.
    - c. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

**2.2 WALL PANELS**

- A. Provide manufacturer's standard // field-assembled, insulated // field-assembled, un-insulated // factory-assembled, insulated // metal wall panels // complete with vapor barrier conforming to ASTM E96/E96M //.

**2.3 ROOF PANELS**

- A. Provide manufacturer's standard // vertical-rib, standing-seam // trapezoidal-rib standing-seam // lap-seam // metal roof panels // with insulation //.

**2.4 ACCESSORIES**

- A. Provide accessories to be compatible with the metal panels and as required for a complete installation.
- B. Sheet metal flashing, trim, metal closure strips, caps and similar metal accessories must not be less than the minimum thickness specified for the metal panels.
- C. Exposed metal accessories/finishes to match the panels furnished, except as otherwise indicated.
- D. Molded foam rib, ridge and other closure strips to be non-absorbent closed-cell or solid-cell synthetic rubber or pre-molded neoprene to match configuration of the panels.
- E. Roof curbs, equipment supports, roof hatches, dropout-type heat and smoke vents, hatch-type heat and smoke vents, gravity and roof ridge ventilators, wall louvers and other miscellaneous roof and wall equipment or penetrations conforming to AAMA, ASTM, and UL and as specified in Division 07 unless otherwise indicated.

**2.5 FABRICATION**

- A. Provide a complete, integrated set of // metal building system manufacturer's standard // mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, // metal roof panels, // metal wall panels, // and accessories complying with requirements indicated. Provide metal building system of size and with spacing, slopes, and spans indicated.
- B. //Fabricate metal panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weather-tight and minimize noise from movements within panel assembly. //

- C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA that apply to the 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.
  2. End Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant 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 of size and metal thickness recommended by SMACNA or by metal building system manufacturer for application, but not less than thickness of metal being secured.

SPEC WRITER NOTES:

1. Specify and add requirements for forced entry/ballistic resistant ratings.

D. Tolerances:

1. Comply with MBMA's "Metal Building System Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

## 2.6 FACTORY FINISH AND PAINTING

A. Shop Priming:

1. Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary structural members with specified primer after fabrication.

B. Primer:

1. Lead and chromate free, rust inhibiting primer compatible with field applied topcoat indicated.
2. Where field applied topcoat is not indicated provide fabricator's standard lead and chromate free, rust inhibiting primer.
3. Do not use asphaltic primers or primers containing red oxide.
4. Color: Gray.

- C. All panels are to receive a factory-applied // polyvinylidene fluoride // Kynar 500/Hylar 5000// \_\_\_\_\_ // finish consisting of a baked-on topcoat with a manufacturer's recommended prime coat.

- D. For color of finish coat, see Section 09 06 00, SCHEDULE FOR FINISHES.

**2.7 MISCELLANEOUS MATERIALS**

## A. Metal Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing.
2. Joint Sealant: ASTM C920; one-part elastomeric polyurethane, polysulfide, or silicon-rubber sealant.

## B. Fasteners:

1. Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory applied coating.
2. Fasteners for Metal Roof and Wall Panels: Self-drilling Type 410 stainless steel or self-tapping Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal panels.

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

- A. Erect metal building system according to manufacturer's written erection instructions, approved shop drawings and other erection documents in accordance with MBMA "Metal Building Systems Manual".
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer and the RE/COR.
- C. Wall Panels: Apply running in a vertical position. Supply panels in single lengths from base to eave with no horizontal joints, except at the junction of door units, louver panels, and similar openings.
- D. Fasteners for Securing Roof and Wall Panels: Fastening method, size and spacing as recommended by metal building manufacturer and as approved by RE/COR.

**3.2 SPECIAL INSPECTION AND TESTING FOR SEISMIC-RESISTING SYSTEMS**

## SPEC WRITER NOTES:

1. This paragraph will be applicable to both new buildings and existing building seismic rehabilitation designs.
2. The designer must indicate on the drawings all locations and all features for which special inspection and testing is required. This includes indicating the locations of all

structural components and connections  
requiring inspections.

3. Add any additional requirements as  
necessary.

A. Perform special inspections and testing for seismic-resisting systems  
and components in accordance with Section 01 45 35, SPECIAL  
INSPECTIONS.

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