

SECTION 13 34 19 METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Architectural Manufacturers' Association (AAMA):
 - a. 101, Standard Specifications for Windows, Doors, and Unit Skylights.
 - b. 605, Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - c. 606.1, Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
2. American Institute of Steel Construction (AISC):
 - a. 360, Specification for Structural Steel Buildings.
 - b. RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts.
 - c. Design Guide 3: Serviceability Design Considerations for Steel Buildings.
3. American Iron and Steel Institute (AISI): Specification for the Design of Cold-Formed Steel Structural Members.
4. American Welding Society (AWS): D1.1/D1.1M, Structural Welding Code - Steel.
5. ASTM International (ASTM):
 - a. A36/A36M, Standard Specification for Carbon Structural Steel.
 - b. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - c. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - d. A490/A490M, Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength.
 - e. A529/A529M, Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 - f. A572/A572M, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - g. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - h. A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - i. A992/A992M, Standard Specification for Steel for Structural Shapes.

- j. C991, Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings.
- k. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- l. E96/E96M, Standard Test Methods for Water Vapor Transmission of Materials.
- m. E2190, Standard Specification for Insulating Glass Unit Performance and Evaluation.
- n. E1514, Standard Specification for Structural Standing Seam Steel Roof Panel Systems.
- o. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- 6. International Accreditation Service, Inc. (IAS): Quality Certification Program.
- 7. International Code Council (ICC): International Building Code (IBC).
- 8. Metal Building Manufacturer's Association (MBMA): Metal Building Systems Manual.
- 9. Steel Door Institute (SDI): A250.8, Standard Steel Doors and Frames.
- 10. UL: 580, Tests for Uplift Resistance of Roof Assemblies.

1.02 SYSTEM DESCRIPTION

- A. Complete building package using manufacturer's standard components.
- B. Primary Framing System: Clear span rigid frame.
- C. Lateral Support System in Longitudinal Direction: Cross bracing, or Portal Frames located as shown on the Drawings.
- D. Include: Roof accessories.

1.03 DESIGN REQUIREMENTS

- A. Applicable Building Code: The 2021 International Building Code (IBC), as amended by the State of Arizona and local agencies.
- B. Refer to design criteria on the Drawing General Structural Notes.
- C. Deflection Criteria:
 - 1. In accordance with AISC Design Guide 3 recommendations. Conformance is required to deflection criteria as stated in the Appendix.
 - 2. Applies to primary and secondary framing members, bracing members, roof panels, and wall cladding.

D. Design Standards:

1. AISC 360.
2. AISC RCSC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.
3. AISI Specification for the Design of Cold-Formed Steel Structural Members.
4. AWS D1.1/D1.1M.

E. Consider prying action of bolts for bolted moment-resistant connections in primary framing.

F. Design column bases as pinned, unless specifically indicated otherwise.

1.04 CONTRACTOR/METAL BUILDING MANUFACTURER COORDINATION

A. Submit metal building Shop Drawings and obtain approval prior to forming foundation concrete or fabricating foundation reinforcing steel. Confirm size of concrete column pilasters for steel column baseplates and its associated anchor bolt template.

B. Verify interface of building components with foundation and coordinate required foundation revisions with Contracting Officer.

1.05 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

- a. Manufacturer's literature and technical data.
- b. Drawings Stamped by Designer:
 - 1) Drawings shall be specifically prepared for this Project.
 - 2) Mark out details that do not apply to Project.
 - 3) Show design load criteria, material specifications for framing members and connections, roof framing plan with dimensions and member sizes, baseplate details showing anchor bolt size and bolt layout, elevations of wall framing and bracing, instructions for temporary bracing, framing around roof and wall openings, details for joining and sealing of roof panels and wall cladding, and sections and details for all components and accessories.
- c. Anchorage and bracing drawings and/or catalog information, as required by Section 01 88 15, Anchorage and Bracing, for loads provided in Section 01 67 00, Product Requirements.
- d. Painting System: Specifications; include paint manufacturer's name, product trade name, and preparation for shop and field coats.

2. Samples: Minimum 2-inch by 3-inch metal for components requiring color selection.

B. Informational Submittals:

1. Structural Calculations Stamped by Designer:
 - a. Complete analysis and design of structural components and connections in accordance with design requirements indicated.
 - b. Summary of building column reactions to foundation level for load cases.
 - c. Mark out calculations that do not apply to Project.
2. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing, for loads provided in Section 01 67 00, Product Requirements. Submit with Action Submittal for the same item.
3. Manufacturer's written instructions for shipping, handling, storage, protection, and erection or installation of building and components.
4. Manufacturer:
 - a. IAS Quality Certification: IAS certificate showing name and address of manufacturer, effective date, and category of certification.
5. Erector:
 - a. IAS Quality Certification: IAS certificate showing name and address of erector, effective date, and category of certification, or in lieu of IAS certification, documentation of past 5 years' experience record to include project name, location, date of completion, building manufacturer, and name and phone number of Contracting Officer's contact person.
 - b. Certification of approval by manufacturer.
6. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

1.06 QUALITY ASSURANCE

A. Qualifications:

1. Designer: Registered professional engineer valid in same state as Project.
2. Manufacturer: IAS Quality Certification: Metal Building Systems (MB).
3. Erector:
 - a. IAS Quality Certification as Certified Steel Erector (CSE), or 5 years of experience in erection of metal building systems in lieu of IAS certification.
 - b. Approval by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect building components and accessories from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Deliver to Site with parts individually tagged.
- C. Store on wood blocking or pallets, flat and off ground, to keep clean and to prevent damage or permanent distortion. Support bundles so there is no danger of tipping, sliding, rolling, shifting, or material damage. Cover with tarpaulins or other suitable weathertight ventilated covering.
- D. Protect finish of metal panels by application of removable plastic film or other suitable material placed between panels. Do not allow panels to come in contact with other material that would result in scratching, denting, staining or other damage to panel finish.

1.08 SPECIAL GUARANTEE

- A. Furnish manufacturer's extended guarantee or warranty, with Government named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of Contracting Officer, removal and replacement of Work specified in this specification section found defective during a minimum period of 5 years and as stated below after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.
- B. Conditions:
 - 1. Finish on metal roof, wall panels, flashing, and trim will not chalk, crack, check, blister, peel, flake, chip, or lose adhesion for 5 years.
 - 2. Roofing will remain weathertight for 20 years.

PART 2 PRODUCTS

2.01 BUILDING SYSTEM MANUFACTURERS

- A. Products manufactured or supplied by the following, and meeting these Specifications, may be used on this Project:
 - 1. American Buildings Company, Columbus, GA.
 - 2. Behlen Manufacturing Co., Columbus, NE.
 - 3. Bigbee Steel Buildings, Inc., Muscle Shoals, AL.
 - 4. Butler Manufacturing Co., Kansas City, MO.
 - 5. CBC Steel Buildings, Lathrop, CA.
 - 6. Ceco Corp., Columbus, MS.
 - 7. Chief Industries, Inc., Rensselaer, IN.

8. Garco Building Systems, Airway Heights, WA.
9. Inland Buildings, Cullman, AL.
10. Kirby Building Systems, Inc., Columbus, GA.
11. NCI Building Systems, Inc., Houston, TX.
12. Nucor Building Systems, Waterloo, IN.
13. Ruffin Building Systems, Oak Grove, LA.
14. Star Building Systems, a Robertson Ceco Co., Oklahoma City, OK.
15. United Structures of America, Inc., Houston, TX.
16. Varco-Pruden Buildings, Memphis, TN.
17. Whirlwind Building Systems, Houston, TX.

2.02 COMPONENTS

A. Structural Framing and Bracing:

1. Primary Framing: ASTM A36/A36M, ASTM A529/A529M, ASTM A572/A572M, or ASTM A992 with 3/16-inch minimum thickness and factory primer compatible with finish coating.
2. Secondary Framing: Steel for cold-formed galvanized channel and z-sections shall be ASTM A653/A653M, Structural Steel (SS) Grade 33 or High-Strength Low-Alloy Steel (HSLAS) Grade 50 Type A or B, with G60 galvanized coating and minimum design thickness equal to 0.0346 inch.
3. Bracing:
 - a. ASTM A36/A36M or ASTM F1554, Grade 36, for threaded rod, or ASTM A36/A36M for rolled shapes.
 - b. Do not use wire rope or cable for permanent bracing.
4. Bolted Connections:
 - a. Primary Framing: ASTM A325 or ASTM A490/A490M high-strength bolted connections.
 - b. Secondary Framing: ASTM A307 or ASTM A325.

B. Roof Panels:

1. Material:
 - a. ASTM A653/A653M or ASTM A792/A792M preformed ribbed steel panels, Grade 50, minimum.
 - b. Minimum 24-gauge galvanized steel with roll-formed corrugations for structural stiffness and appearance.
 - c. Finish: Factory-applied baked enamel, in color shown.
2. Roof Panel System:
 - a. ASTM E1514 structural standing seam steel roof panel system.
 - b. Panels: One piece from eave to ridge, with concealed clips and fasteners to purlins to allow for thermal movement over 120-degree ambient temperature range.

- c. Sidelap Joints: Fabricate with a factory caulked, mechanically seamed cleat.
- d. Tested and certified to meet UL 580, Class 90 wind uplift rating.

2.03 ACCESSORIES

- A. Trim: Factory-formed and factory-painted ridge cap, rake trim, simple eave trim, panel side trim, corner trim, and other trim as necessary.
- B. Gutter Fascia and Downspouts:
 - 1. Material: ASTM A653/A653M, 26-gauge galvanized steel.
 - 2. Gutter Fascia:
 - a. Prefinish.
 - b. Furnish hangers with factory-applied paint.
 - 3. Preformed Corner Closures: Furnish to match configuration of gable fascia.
 - 4. Downspouts:
 - a. Configuration: Nominal 4-inch corrugated rectangular box with minimum 11 square inches of cross-section area.
 - b. Factory finish to match wall panels.
- C. Miscellaneous: Furnish fasteners, metal-backed polychloroprene washers, weatherstripping, sealants, roof jacks, roof curbs, gaskets, and other items as required for a complete installation.

2.04 FABRICATION

- A. Factory Fabricate: To manufacturer's written standards, MBMA Metal Building Systems Manual, and AISC Specification for Structural Steel Buildings.
- B. Building Parts: Accurate and true to dimension to facilitate building erection without cutting, fitting, or other alterations.
- C. Welded Connections: In accordance with AWS D1.1/D1.1M.
- D. Shop Primer for Primary Framing: Clean and apply one coat of manufacturer's standard primer in accordance with MBMA Metal Building Systems Manual.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine supporting concrete foundation and anchor bolt placement for compliance with requirements for installation tolerances and other conditions affecting performance of metal building.

3.02 BUILDING ERECTION

- A. Erect building system in accordance with manufacturer's standards and instructions.
- B. Provide temporary bracing in accordance with MBMA standards and as required for safe installation.
- C. Structural Framing:
 - 1. Do not field cut or alter primary or secondary framing members.
 - 2. Installation and Tolerances: In accordance with MBMA Metal Building Systems Manual.
- D. Roof Panels:
 - 1. Field cutting of panels by torch is not permitted.
 - 2. Attach panels to structural supports to maintain a weathertight seal while allowing for thermal and structural movement.
 - a. Install exposed fasteners in true vertical and horizontal alignment.
 - b. Field seam side laps of standing seam roof panels using electrically operated seaming machine.
 - c. Use proper tools to install screw fasteners to compress polychloroprene washer without damaging washer or stripping metal.
 - 3. Install manufacturer's standard joint sealants, gaskets, and closure strips as required for weathertight installation.
 - 4. Field Cutting and Patching: Perform in manner not to impair appearance, weathertightness, or structural capacity of panel system.

3.03 REPAIR, CLEANING, AND PAINTING

- A. Immediately following erection, remove unused material, screws, fasteners, and other debris from completed installation. Use caution in removing metal cuttings from surface of prefinished metal panels.
- B. Replace damaged, dented, buckled, or discolored metal panels.

- C. Repair damaged painted and galvanized surfaces as specified in Section 09 90 00, Painting and Coating.
- D. Finish Painting: As specified in Section 09 90 00, Painting and Coating.

3.04 FIELD QUALITY CONTROL

- A. Special inspection will be provided by Contractor.

3.05 MANUFACTURER'S SERVICES

- A. Provide manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection, and certification of proper installation.

END OF SECTION

