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SAMPLE SPECIFICATION FOR METAL BUILDING SYSTEMS

Notes shown in red italics are for the guidance of the specifier and are not to be included as part of the specification. Notes in blue are provided as suggestions and must be edited or deleted prior to publication.

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This Section includes performance and prescriptive type specifications. Edit to avoid conflicting requirements.

This specification covers the design, material, fabrication, shipment and erection of metal building systems. For the material, erection and other field-work included and excluded in the metal building system refer to MBMA Common Industry Practices.

1. GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Structural steel main building frames and secondary framing including purlins and girt, engineered and supplied by the Manufacturer.
- 1.1.2. [Insulated] steel wall and roof system including [soffits,] [gutters and downspouts,] and [X].
- 1.1.3. [Exterior doors,] [windows,] [light transmitting panels,] [overhead doors,] [louvers,] and [X].

NOTE: List Sections that specify installation of products specified in this Section and indicate specific item.

1.2. RELATED SECTIONS

- 1.2.1. Section [X]: Placement of anchor rods.
- 1.2.2. Section [X]: Concrete
- 1.2.3. Section [X]: Doors
- 1.2.4. Section [X]: Painting – Finish painting of primed steel surfaces.

1.3. REFERENCES

NOTE: List reference standards that are included within the text of this Specification. Edit the following as required for project conditions.

- 1.3.1. AISI – Specification for the Design of Cold-Formed Steel Structural Members – 1986 Edition with 1989 Addendum.
- 1.3.2. AISC – Specification for Structural Steel Buildings – 1999.
- 1.3.3. AISC – Code of Standard Practice for Steel Buildings and Bridges – 2000.

- 1.3.4. ASTM A36-00 – Specification for Structural Steel.
- 1.3.5. ASTM A-153-00 – Specification for Zinc Coated (Hot Dip) on Iron and Steel Hardware.
- 1.3.6. ASTM A307-00 – Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- 1.3.7. ASTM A325-00 – Specification for High Strength Bolts for Structural Steel Joists.
- 1.3.8. ASTM A123-00 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- 1.3.9. ASTM A653-00 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanealed) by the Hot-Dip Process.
- 1.3.10. ASTM A463-00 – Specification for Steel Sheet Cold Rolled Aluminum Coated Type 1 and Type 2.
- 1.3.11. ASTM A490-00 – Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
- 1.3.12. ASTM A500-99 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- 1.3.13. ASTM A501-99 – Hot Formed Welded and Seamless Carbon Steel Structural Tubing.
- 1.3.14. ASTM A529-96 – Structural Steel with 50,000 psi Minimum Yield Point.
- 1.3.15. ASTM A1011-00 – Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
- 1.3.16. ASTM A572-00 – Specification for High Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.
- 1.3.17. ASTM 792-99 – Specification for Steel Sheet Aluminum Zinc Alloy Coated by the Hot-Dip Process, General Requirements.
- 1.3.18. ASTM C991-98 – Specification for Flexible Glass Fiber Insulation for Metal Buildings
- 1.3.19. ASTM D3841-97 – Specification for Glass-Fiber Reinforced Polyester Plastic Panels.
- 1.3.20. ASTM E1514-98 – Specification for Structural Standing Seam Steel Roof Panel Systems.
- 1.3.21. AWS A2.4-98 – Standard Welding Symbols.
- 1.3.22. AWS D1.1-2000 – Structural Welding Code – Steel.
- 1.3.23. AWS D1.3-98 – Structural Welding Code – Sheet Steel.
- 1.3.24. IBC (International Building Code) – 1604.3.1. Deflections – 2000 Edition.
- 1.3.25. MBMA Low Rise Building Systems Manual – 1996 Edition.
- 1.3.26. NAIMA 404-96 – Standard for Flexible Fiberglass Insulation Systems in Metal Buildings.
- 1.3.27. SJI – Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders – 1994.
- 1.3.28. SSPC – SSPC-2-00 – Specification for Hand Tool Cleaning.

1.4. SYSTEM DESCRIPTION

NOTE: Use this Article carefully; restrict statements to describe components used to assemble the system.

1.4.1. [Clear span rigid frames.] [Rigid frames supported with interior columns.]

1.4.2. [Critical dimensions:]

1.4.2.1. [Minimum clearance at haunch: /X/ ft.]

- 1.4.2.2. [Minimum clearance haunch to haunch: *[X]* ft.]
- 1.4.2.3. [Minimum clearance at peak: *[X]* ft.]
- 1.4.2.4. [Maximum depth column: *[X]* ft.]
- 1.4.3. Bay spacing [of *[X]* ft. per bay] [as shown on Drawings].
- 1.4.4. Primary Framing: Rigid frame of rafter beams and columns [and intermediate columns] and wind bracing.
- 1.4.5. Secondary Framing: Purlins, girts, eave struts, flange bracing, and other related items.
- 1.4.6. Lateral Bracing: Horizontal loads not resisted by main frame action shall be resisted by [cable] [rod] and/or [diaphragm] [portal frames] [fixed base columns] in the sidewall. [Diaphragm] and/or [cable] [rod] [portal frame] [fixed base columns] in the endwalls. [Cable] [rod] in the roof.
- 1.4.7. Wall and Roof Systems: Preformed steel panels [insulation], [liner panels], and accessory components.
- 1.4.8. Roof Slope: *[X]*: 12
- 1.5. DESIGN REQUIREMENTS

NOTE: Use the Article carefully; restrict statements to identify system design requirements only.

- 1.5.1. Members to withstand the following loads:
 - 1.5.1.1. Building system dead loads.
 - 1.5.1.2. Live Load: *[X]* psf, [with] [without] tributary area load reduction
 - 1.5.1.3. Collateral Load: *[X]* psf
 - 1.5.1.4. Ground Snow Load: *[X]* psf [,Snow Exposure *[X]*]
 - 1.5.1.5. Wind Velocity: *[X]* mph [, Wind Exposure *[X]*]
 - 1.5.1.6. Seismic Acceleration: [*A_v*: *[X]* and *A_a* *[X]*] [Seismic Zone: *[X]*] [*C_s*: *[X]*] [*S_s*: *[X]*]
 - 1.5.1.7. MBMA Building Use Category: [1] [2] [3] [4]
 - 1.5.1.8. All loads shall be proportioned and applied in accordance with the latest edition of the MBMA Low Rise Building Systems Manual.
- 1.5.2. Deflection requirements shall be in accordance with section 1604.3.1 of the International Building Code, 2000 edition.
- 1.5.3. Assembly to permit movement of components without buckling, failure or joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of *[X]* degrees F.
- 1.5.4. Roof drainage system to withstand rainfall intensity of *[X]* inches per hour with 5-minute duration.
- 1.5.5. [Site Conditions: The following site features and adjacent structures must be considered in the design. Building is *X* feet above surrounding terrain. Building is *X* feet away from a *X* ft. wide x *X* ft. long x *X* high adjacent building, as shown on drawings.]

1.6. Submittals

NOTE: Do not request additional submittals if Contract Documents sufficiently describe the products of this Section. Require only submittal of material which must be verified by the specifier.

1.6.1. Manufacturer will submit the following documents for approval: Engineer's Letter of Certification, [Permit Drawings,] [Column Reactions,] Anchor Rod Plan, Building Erection Drawings.

NOTE: When Manufacturer's instructions for specific installation requirements are referenced in Part 3 EXECUTION, include the following request for submittal of those instructions. Edit the Part 3 statement to avoid conflict with Manufacturer's instructions.

1.6.2. Product Specification: Manufacturer will provide specifications and description of its standard materials.

1.6.3. Installation Instructions: Manufacturer will provide installation instructions that indicate preparation requirements and assembly sequence.

1.7. Quality Assurance: Fabricate structural steel members in accordance with MBMA Low Rise Building Systems Manual, and, for items not covered, AISC – Specification for Structural Steel for Buildings.

1.8. Qualifications

1.8.1. Manufacturer: The Manufacturer shall have a minimum of five (5) years experience in the manufacture of metal building systems.

1.8.2. Quality System: Manufacturer shall submit a Quality Policy document stating the Manufacturer's commitment to quality.

1.8.3. Licensed Engineer: Structural framing shall be the design of a Professional Engineer licensed in the state in which the Project is located.

NOTE: Include the following section for projects involving additions to or adjacent to existing structures.

1.9. Field Measurements

1.9.1. Metal building contractor shall verify that field measurements are as [indicated [on the Contract] [on the Erection Drawings].] [instructed by the Manufacturer.]

1.10. Warranty

NOTE: Panel warranties generally are available to include coverage against perforations. Paint warranties generally include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Roof warranties may be available through the metal building contractor to include coverage for weather tightness of building enclosure elements after installation.

1.10.1. Workmanship: Manufacturer's Workmanship Warranty shall be for of 1 year.

1.10.2. Panel Warranty: Manufacturer's Panel Warranty shall be for 20 years.

1.11. Administration

1.11.1. All nomenclature shall conform to the MBMA Low Rise Building Systems Manual.

1.11.2. Coordination and administration of the work shall be in accordance with the MBMA Low Rise Building Systems Manual – Common Industry Practices.

2. PRODUCTS

NOTE: Edit the following descriptive specifications to identify project requirements.

2.1. Materials – Roof System

NOTE: The following material list is oriented to site assembled roof component assemblies. Manufacturer's standard fasteners must be commensurate with panel material and performance level specified.

- 2.1.1. Sheet Steel Stock: Zinc-aluminum coated to AZ55 designation as required by manufacturer's design.
- 2.1.2. Roof Insulation: ASTM C991-98 roll glass fiber type, faced with [reinforced,] [foil] [white vinyl], UL frame spread classification of 25 or less where exposed, [X] inches thick. [Provide external wire support.] [Insulation [is] [is not] required at soffit panels.]
- 2.1.3. Through Fastened Roofing: Minimum 0.0185 inches thick panel, Galvalume® or Galvalume® Plus material, profile to be ["PBR"] [as indicated on Drawings], UL90 rated, with continuous sealant at side laps.
- 2.1.4. Standing Seam Roofing: Minimum 0.023 inches thick panel, Galvalume® or Galvalume® Plus material, [Ultra-Dek® System] [Double-Lok® System] as manufactured by MBCI, [Fixed] [Floating] [Articulating] clips, and all roof accessories recommended by MBCI.
- 2.1.5. Soffit Panels: Minimum 0.0185 inches thick panel, Galvalume® or Galvalume® Plus material, Reverse "U" profile as manufactured by MBCI, and unperforated.
- 2.1.6. Closures: Manufacturer's standard type.
- 2.1.7. Fasteners:
 - 2.1.7.1. Through Fastened System: Panels shall be attached to the secondary framing members by means of a self-drilling structural carbon steel screw with a zinc-alloy head, finished to match roof panel, and assembled with an EPDM washer.
 - 2.1.7.2. Standing Seam System: As recommended by MBCI.
- 2.1.8. Sealant: Manufacturer's standard type.

NOTE: Include 2.1.9 if roof panel is to have a color finish. PVDF is a premium finish and is normally furnished at an increased cost and delivery time.
- 2.1.9. Exterior Panel Finish: Precoated steel of [silicone polyester] [polyvinylidene (PVDF)] finish. Colors to be selected from Manufacturer's standard selection.
- 2.2. Materials – Wall Systems
 - 2.2.1. Sheet Steel Stock: Zinc-aluminum coated to AZ55 designation as required by manufacturer's design.
 - 2.2.2. Siding: Minimum 0.0185 inches thick panel, Galvalume® or Galvalume® Plus material, profile to be ["R"] [as indicated on Drawings].
 - 2.2.3. Wall Insulation: ASTM C991-98 roll glass fiber type, faced with [reinforced,] [foil] [white vinyl], UL frame spread classification of 25 or less where exposed, [X] inches thick. [Provide external wire support.]
 - 2.2.4. Liner: Minimum 0.0185 inches thick panel, Galvalume® or Galvalume® Plus material, profile to be [Reverse "U"] [as indicated on Drawings].
 - 2.2.5. Closures: Manufacturer's standard type.
 - 2.2.6. Fasteners: Wall panels shall be attached to the secondary framing members by means of a self-drilling fastener of carbon steel, hex washer head with EPDM bonded washers.

NOTE: Include 2.2.7 if wall panel is to have a color finish. PVDF is a premium finish and is normally furnished at an increased cost and delivery time.
 - 2.2.7. Exterior Panel Finish: Precoated steel of [silicone polyester] [polyvinylidene (PVDF)] finish. Colors to be selected from Manufacturer's standard selection.

- 2.3. Materials – Trim: Flashings, internal and external corners, closure pieces, and etc. shall be the same material and finish as adjacent material. Profiles shall be Manufacturer’s standard. Colors to be selected from Manufacturer’s standard selection.
- 2.4. Metal Personnel Doors and Frames:
- 2.4.1. Personnel doors shall be 3’-0” x 7’-0” x 1 ¾” manufactured from 20 gauge galvanized steel.
 - 2.4.2. Door shall have square edges for no-handed installation.
 - 2.4.3. Door shall have an embossed finish with a white prime coat.
 - 2.4.4. Doors shall be flush and have vertical mechanical interlocking seams on both hinge and lock edges.
 - 2.4.5. Doors shall be provided with top and bottom inverted 16 gauge galvanized steel channels spot welded within the door.
 - 2.4.6. Doors shall be reinforced, stiffened, and sound deadened with impregnated Kraft honeycomb core completely filling the inside faces of the door and laminated to the inside faces of the panels.
 - 2.4.7. Doors shall be reinforced for applicable hardware.
 - 2.4.8. Glazing, if applicable, shall be by other trades in the field.
 - 2.4.9. Door frames shall be 16 gauge galvanized steel, pre-painted white with jamb depth as required to fit girts.
 - 2.4.10. Door jambs shall be constructed for non-hand installation.
 - 2.4.11. Door frames shall be provided with head and jamb flashing and optional weather strip.
 - 2.4.12. Door frames shall be provided with three 4 ½” x 4 ½” hinges and reversible strike plate.
 - 2.4.13. Lockset shall be a deadbolt with a cylindrical passage knob. The deadbolt shall meet ANSI A156.5 – E5152 or equal, and the cylindrical passage knob shall meet ANSI 156.2 – F75 or equal.
 - 2.4.14. Door threshold shall be aluminum, supplied with flat head screws and expansion shields for attachment to masonry floor.
- 2.5. Windows
- 2.5.1. Manufacturer shall provide [its standard window and frame type to match sizes as shown on Drawings] [windows as described in window schedule in Drawings].
 - 2.5.2. Windows must meet ANSI/AAMA 101-97 performance requirements as specified by the Architectural Aluminum Manufacturers Association.
- 2.6. Light Transmitting Panels (LTP):
- 2.6.1. Roof Mounted: LTP installed in the roof shall be white translucent panels capable of sustaining a 200 pound concentrated load on a one square foot area located on the panel without rupture. LTP shall comply with ASTM D3841, Type CC2, and Grade 2. TLP will weigh a minimum of 8 ounces per square foot, and will be white in color.
 - 2.6.2. Wall Mounted: LTP shall comply with ASTM D3841, Type CC2, and Grade 2. TLP will weigh a minimum of 8 ounces per square foot, and will be white in color.
- 2.7. Fabrication – Primary Framing
- 2.7.1. Framing Members: Clean in accordance with SSPC-SP2, prepare, and [coat with Manufacturer’s standard primer] [galvanize to ASTM A123-00] [supply black (unpainted)].
 - 2.7.2. Hot rolled members shall be fabricated in accordance with AISC Specification for pipe, tube, and rolled structural shapes.

- 2.7.3. Fabricate built-up members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- 2.8. Fabrication – Wall and Roof Framing
- 2.8.1. Framing Members: Clean in accordance with SSPC-SP2, prepare, and [coat with Manufacturer’s standard primer] [galvanize to ASTM A123-00] [supply black (unpainted)].
- 2.8.2. Cold Formed Members: Cold formed shapes shall be fabricated in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- 2.9. ACCESSORIES
- 2.9.1. Ridge Vents: Gravity ridge ventilators shall be manufactured from Galvalume® or Galvalume® Plus material and same finish as roof panel. The ventilator body shall be 26 gauge (.0185 min.) with flat skirts and shall be pre-formed for a 1:12 pitch. Chain operated damper will be furnished when specified on Drawings. Ventilators shall be equipped with birdscreens, dampers, and riveted end caps. Ventilators shall be 10’ long and have a 9 inch throat.
- 2.9.2. Manufacturer, when indicated on Drawings, shall provide curbs for HVAC, skylights, hatches, etc. Material shall be compatible with steel roof panel and sealed against water penetration in accordance with Manufacturer’s instructions.
- 2.10. Fabrication – Gutter and Downspouts
- 2.10.1. Fabricate gutters from Minimum 0.0185 inches thick panel, Galvalume® or Galvalume® Plus material. Color to be selected from Manufacturer’s standard selection.
- 2.10.2. Fabricate downspouts from Minimum 0.0185 inches thick panel, Galvalume® or Galvalume® Plus material. Color to be selected from Manufacturer’s standard selection.
- 2.10.3. Gutter and downspout profiles per Manufacturer’s standard.
- 2.10.4. Form sections in maximum possible lengths. Hem exposed edges.
- 2.10.5. Fabricate gutter support straps of Manufacturer’s standard material and finish.
- 2.10.6. Fabricate downspout straps of Manufacturer’s standard material. Color to be selected from Manufacturer’s standard selection.
3. EXECUTION
- 3.1. Examination:
- 3.1.1. Verify that placed anchor rods are in correct position.
- 3.1.2. Provide access to the work as scheduled for Owner provided inspections, if required. The cost of any required inspection is the responsibility of the Owner.
- 3.2. Erection – Framing
- 3.2.1. Erect framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- 3.2.2. The Erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads, such as wind loads acting on the exposed framing and seismic forces, as well as loads due to erection equipment and erection operation, but not including loads resulting from the performance of work by others. Bracing furnished by the Manufacturer for the metal building system cannot be assumed to be adequate during erection. The temporary guys, braces, falseworks and cribbing are the property of the Erector, and the Erector shall remove the them immediately upon completion of erection.

- 3.2.3. Do not cut or alter structural members without approval of the Manufacturer.
- 3.2.4. After erection, prime welds, abrasions, and surfaces not [\[shop primed.\]](#) [\[galvanized.\]](#)
- 3.3. Erection – Wall and Roofing Systems
 - 3.3.1. Install in accordance with Manufacturer’s instructions.
 - 3.3.2. Exercise care when cutting pre-finished material to ensure cuttings do not remain on finish surface.
 - 3.3.3. Fasten cladding to structural supports, aligned level and plumb.
- 3.4. Erection – Gutter and Downspouts
 - 3.4.1. Install gutters and downspouts in strict accordance with Manufacturer’s instructions.
- 3.5. Erection – Light Transmitting Panels
 - 3.5.1. Install in accordance with Manufacturer’s instructions.
 - 3.5.2. Coordinate with installation of roofing system and related flashings.
 - 3.5.3. Provide weathertight installation.
- 3.6. Installation – Accessories
 - 3.6.1. Install all accessories in accordance with accessory manufacturer’s instructions.
- 3.7. Tolerances
 - 3.7.1. All work shall be performed in a workmanlike manner.
 - 3.7.2. Install framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.