SECTION 13 12 10
METAL BUILDING SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

A. This Section includes a single-story, single-span, rigid-frame-type pre-engineered metal building of the nominal length, width, eave height, and roof pitch indicated.
   1. Exterior ceilings are covered with field-assembled wall panels attached to framing members using exposed fasteners. Endwalls are not expandable.
   2. Roof system shall consist of a 1½” type “B” minimum 22 ga structural metal deck secured directly to the purlins. See 07 41 20 for the components that shall be applied over the metal deck. The bottom of the purlins shall be covered with the same material as the wall panels.
   3. Manufacturer's standard building components and accessories may be used, provided components, accessories, and complete structure conform to design indicated and specified requirements.

B. Related Sections: The following sections contain requirements that relate to this section:
   1. Concrete floor and foundations and installation of anchor bolts are specified in Division 3 Section "Concrete Work."
   2. Sealants and calking are specified in Division 7 Section "Joint Sealers."
   3. Finish hardware and provisions for masterkeying are specified in Division 8 Section "Finish Hardware."

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Engineer, design, fabricate and erect the pre-engineered metal building system to withstand loads from winds, gravity, structural movement including movement thermally induced, and to resist in-service use conditions that the building will experience, including exposure to the weather, without failure.
   1. Design each member to withstand stresses resulting from combinations of loads that produce the maximum allowable stresses in that member as prescribed in MBMA's "Design Practices Manual."

B. Design Loads: Basic design loads, as well as auxiliary and collateral loads, are indicated on the drawings.
   1. Basic design loads include live load and wind load, in addition to the dead load.
   2. Collateral loads include additional dead loads over and above the weight of the metal building system such as sprinkler systems, suspended refrigeration panels, and roof-mounted mechanical systems.

C. Structural Framing and Roof and Ceiling Panels: Design primary and secondary structural members and exterior covering materials for applicable loads and combinations of loads in accordance with the Metal Building Manufacturers Association's (MBMA) "Design Practices Manual."

1. Structural Steel: Comply with the American Institute of Steel Construction's (AISC) "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" for design requirements and allowable stresses.
2. Light Gage Steel: Comply with the American Iron and Steel Institute's (AISI) "Specification for the Design of Cold Formed Steel Structural Members" and "Design of Light Gage Steel Diaphragms" for design requirements and allowable stresses.
3. Welded Connections: Comply with the American Welding Society's (AWS) "Standard Code for Arc and Gas Welding in Building Construction" for welding procedures.

D. Building Accessories: Provide metal building system accessories that comply with the Architectural drawings.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
B. Product data consisting of metal building system manufacturer's product information for building components and accessories.
C. Shop drawings for metal building structural framing system, roofing and siding panels, and other metal building system components and accessories that are not fully detailed or dimensioned in manufacturer's product data.
   1. Structural Framing: Furnish complete erection drawings prepared by or under the supervision of a professional engineer legally authorized to practice in the jurisdiction where the Project is located. Include details showing fabrication and assembly of the metal building system. Show anchor bolts settings and roof framing. Include transverse cross-sections.
   2. Roofing and Ceiling Panels: Provide layouts of panels on ceilings and roofs, details of edge conditions, joints, corners, custom profiles, supports, anchorages, trim, flashings, closures, and special details. Include transverse cross-sections.
E. Samples for initial selection purposes in form of manufacturer's color charts or chips showing full range of colors, textures, and patterns available for metal roofing and siding panels with factory-applied finishes.
F. Samples for verification purposes of roofing and ceiling panels. Provide sample panels 12 inch (300 mm) long by actual panel width, in the profile, style, color, and texture indicated. Include clips, battens, fasteners, closures, and other panel accessories.
G. Installer certificates signed by metal building manufacturer written certification certifying that the installer complies with requirements included under the "Quality Assurance" Article.
H. Professional engineer's certificate prepared and signed by a Professional Engineer, legally authorized to practice in the jurisdiction where Project is located, verifying that the structural framing and covering panels meet indicated loading requirements and codes of authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer to erect the pre-engineered metal building who has specialized in the erection and installation of types of metal buildings systems similar to that required for this project and who is certified in writing by the metal building system manufacturer as qualified for erection of the manufacturer's products.

B. Manufacturer's Qualifications: Provide pre-engineered metal buildings manufactured by a firm experienced in manufacturing metal buildings systems that are similar to those indicated for this project and have a record of successful in-service performance.

C. Single-Source Responsibility: Obtain the metal building system components, including structural framing, ceiling and roof covering, and accessory components, from one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed. Package ceiling and roof panels for protection against transportation damage.
B. Handling: Exercise care in unloading, storing, and erecting ceiling and roof covering panels to prevent bending, warping, twisting, and surface damage.
C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering. Store metal ceiling and roof panels so that water accumulations will drain freely. Do not store panels in contact with other materials that might cause staining, denting or other surface damage.

1.7 WARRANTY

A. Ceiling Panel Finish Warranty: Furnish the ceiling panel manufacturer's written warranty, covering failure of the factory-applied exterior finish within the warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.
    1. Warranty period for factory-applied exterior finishes on ceiling panels is 20 years after the date of Final Completion.

1.8 EXTRA MATERIALS

A. Maintenance Stock: Furnish at least 5 percent excess over required amount of nuts, bolts, screws, washers, and other required fasteners for each metal building. Pack in cartons labeled to identify the contents and store on the site where directed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with specified requirements, provide metal building systems provided by the following:
    1. American Buildings Co.
    2. Steelox
    3. Ceco
    4. Nucor
    5. PEMB LLC

2.2 MATERIALS

A. Hot-Rolled Structural Steel Shapes: Comply with ASTM A 36 (ASTM A 36M) or ASTM A 529 (ASTM A 529M).
B. Steel Tubing or Pipe: Comply with ASTM A 500 Grade B, ASTM A 501, or ASTM A 53.
C. Steel Members Fabricated from Plate or Bar Stock: Provide 42,000 psi (290 MPa) minimum yield strength. Comply with ASTM A 529 (ASTM A 529M), ASTM A 570 (ASTM A 570M), or ASTM A 572 (ASTM A 572M).

D. Steel Members Fabricated by Cold Forming: Comply with ASTM A 607 Grade 50.
E. Cold-Rolled Carbon Steel Sheet: Comply with requirements of ASTM A 366 (ASTM A 366M) or ASTM A 568 (ASTM A 568M).
F. Hot-Rolled Carbon Steel Sheet: Comply with requirements of ASTM A 568 (ASTM A 568M) or ASTM A 569.
G. Structural Quality Zinc-Coated (Galvanized) Steel Sheet: Comply with ASTM A 446 with G90 (ASTM A 446M with Z275) coating complying with ASTM A 525 (ASTM A 525M). Grade to suit manufacturer's standards.
H. Commercial Quality Zinc-Coated (Galvanized) Steel Sheet: Comply with ASTM A 526 with G60 (ASTM A 526M with Z180) coating complying with ASTM A 525 (ASTM A 525M).
I. Aluminum-Coated Steel Sheets: Comply with ASTM A 463 with T1-40 coating.
J. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) for Alclad alloy 3003 or 3004 with temper as required to suit forming operations.
K. Bolts for Structural Framing: Comply with ASTM A 307 or ASTM A 325 (ASTM A 325M) as necessary for design loads and connection details.
L. Glass and Glazing Materials: Provide glass complying with ASTM C 1036, of quality and type as shown on Architectural drawings. Place manufacturer's label identification on each glass light.
M. Thermal Insulation: Glass fiber blanket insulation, complying with ASTM C 991, of 0.5 lb per cu. ft. (8 kg/cu. m) density, thickness as indicated, with UL flame spread classification of 25 or less, and 2 inch (50 mm) wide continuous vapor-tight edge tabs.
N. Paint and Coating Materials: Comply with performance requirements of the federal specifications indicated. Unless specifically indicated otherwise, compliance with compositional requirements of federal specifications indicated is not required.
    1. Shop Primer for Ferrous Metal: Fast-curing, lead-free, universal primer, selected by the manufacturer for resistance to normal atmospheric corrosion, compatibility with finish paint systems, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure. Comply with FS TT-P-645.

2.3 STRUCTURAL FRAMING

A. Rigid Frames: Fabricate from hot-rolled structural steel shapes. Provide factory-welded, shop-painted, built-up "I-beam"-shape or open-web-type frames consisting of tapered or parallel flange beams and tapered columns. Furnish frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly.
    1. Provide length of span and spacing of frames indicated. Slight variations in length of span and frame spacing may be acceptable if necessary to meet manufacturer's standard.
    2. Provide rigid frames where indicated.
B. Secondary Framing: Provide the following secondary framing members:
    1. Roof Purlins, Sidewall and Endwall Girts: "C"-or "Z"-shaped sections shop-painted roll-formed steel. Purlin spacers shall be fabricated from 14 gage (2.0 mm) cold-formed galvanized steel sections.
    2. Eave Struts: Unequal flange "C"-shaped sections formed to provide adequate backup for both ceiling and roof panels.
    3. Flange and Sag Bracing: Angles, shop-painted roll-formed steel.
    4. Base or Sill Angles: Fabricate from 14 gage (1.9 mm) cold-formed galvanized steel sections.
    5. Secondary endwall structural members, except columns and beams, shall be the manufacturer's standard sections fabricated from 14 gage (2.0 mm) cold-formed galvanized steel.

D. Wind Bracing: Provide adjustable wind bracing using threaded steel rods; comply with ASTM A 36/A36M or ASTM A 572/A572M, Grade D. Locate interior end bay bracing only where indicated.
E. Bolts: Provide shop-painted bolts except when structural framing components are in direct contact with roofing and siding panels. Provide zinc-plated or cadmium-plated bolts when structural framing components are in direct contact with roofing and siding panels.
F. Shop Painting: Clean surfaces to be primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond. Follow procedures of SSPC-SP3 for power-tool cleaning, SSPC-SP7 for brush-off blast cleaning, and SSPC-SP1 for solvent cleaning.
    1. Prime structural steel primary and secondary framing members with the manufacturer's standard rust-inhibitive primer.
    2. Prime galvanized members, after phosphoric acid pretreatment, with manufacturer's standard zinc dust-zinc oxide primer.

2.4 ROOFING AND CEILING PANELS

A. Face Sheets: Fabricate ceiling panel face sheets to the profile or configuration indicated in drawings.
B. Standing Seam Roof Panels: See Specification Section 07 41 20.
C. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets, self-locking bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
    1. Provide metal-backed neoprene washers under heads of fasteners bearing on weather side of panels.
    2. Use aluminum or stainless steel fasteners for exterior application and galvanized or cadmium-plated fasteners for interior applications.
    3. Locate and space fastenings in true vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.
    4. Provide fasteners with heads matching color of roofing or siding sheets by means of plastic caps or factory-applied coating.
D. Accessories: Provide the following sheet metal accessories factory-formed of the same material in the same finish as roof and ceiling panels:
    1. Flashings.
    2. Closers.
    3. Fillers.
    4. Metal expansion joints.
    5. Ridge covers.
    6. Fascias.
E. Flexible Closure Strips: Closed-cell, expanded cellular rubber, self-extinguishing flexible closure strips. Cut or premold to match configuration of roofing and siding sheets. Provide closure strips where indicated or necessary to ensure weathertight construction.
F. Sealing Tape: Pressure-sensitive 100 percent solids grey polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
G. Joint Sealant: One-part elastomeric polyurethane, polysulfide, or silicone rubber sealant as recommended by the building manufacturer.
H. Baked Enamel Finish: Provide the manufacturer's standard shop- applied baked enamel finish to galvanized steel ceiling panels, and related trim and accessory elements. Apply finish coat on exterior facings and manufacturer's standard wash coat on reverse face.
    1. Clean galvanized steel with an alkaline compound, then treat with a zinc phosphate conversion coating, and seal with a chromic acid rinse.

2. Apply baked-on thermo-setting modified acrylic enamel to pretreated steel sheets, in one or more coats as standard with the manufacturer to achieve a minimum dry film thickness of 1.5 mils (0.04 mm).
   a. Color: As selected by the Architect from the manufacturer's standard colors. Soffit Panel Color – Pac-Clad: BONE-WHITE

2.5 SHEET METAL ACCESSORIES

A. General: Provide coated steel sheet metal accessories with coated steel siding panels.
B. Gutters: See Specification Section 07 60 00.
C. Downspouts: See Specification Section 07 60 00.

2.6 FABRICATION

A. General: Design prefabricated components and necessary field connections required for erection to permit easy assembly and disassembly.
   1. Fabricate components in such a manner that once assembled, they may be disassembled, repackaged, and reassembled with a minimum amount of labor.
   2. Clearly and legibly mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
B. Structural Framing: Shop-fabricate framing components to indicated size and section with base plates, bearing plates, and other plates required for erection, welded in place. Provide holes for anchoring or connections shop-drilled or punched to template dimensions.
   1. Shop Connections: Provide bolted, or welded shop connections.
   2. Field Connections: Provide bolted field connections.

PART 3 – EXECUTION

3.1 ERECTION

A. Framing: Erect framing true to line, level, plumb, rigid, and secure. Level base plates to a true even plane with full bearing to supporting structures.
B. Purlins and Girts: Provide rake or gable purlins with tight-fitting closure channels and fascias. Secure purlins and girts to structural framing and hold rigidly to a straight line by sag rods.
C. Bracing: Provide diagonal rod or angle bracing in roof.
   1. Movement-resisting frames shall be used in lieu of sidewall rod bracing, to suit manufacturer's standards.
   2. Where diaphragm strength of roof or wall covering is adequate to resist wind forces, rod or angle bracing will not be required.
D. Framed Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to building structural frame.

3.2 CEILING

A. General: Arrange and nest sidelap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line. Protect factory finishes from damage.
   1. Field cutting of exterior panels by torch is not permitted.

B. Sheet Metal Accessories: Install gutters, downspouts, and other sheet metal accessories in accordance with manufacturer's recommendations for positive anchorage to building and weathertight mounting and see Specification Section 07 60 00.

C. Cleaning and Touch-Up: Clean component surfaces of matter that could preclude paint bond. Touch up abrasions, marks, skips, or other defects to shop-primed surfaces with same type material as shop primer.

END OF SECTION