SECTION 13121 - METAL BUILDING SYSTEMS

PART 1 GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section describes the construction of a single-story, rigid-frame-type pre-engineered metal building of the nominal length, width, eave height, and roof pitch as shown on the drawings. Specified Work includes, but may not be limited to, the following:

Structural steel frame, standing seam Roof system and field seaming machine, roof drainage system, and exterior wall panel system,

Manufacturer's standard components may be used, provided components, accessories, and complete structure conform to architectural design appearance shown and to specified requirements. All materials are to be new and free of defects.

RELATED SECTIONS

Section 04810 - Unit Masonry Assemblies: non-bearing exterior building envelope.
Section 03300 - Cast-in-Place Concrete: Foundations and anchor bolts.
Section 09900 - Paints and Coatings: Finish painting of structural members.

REFERENCES FOR MATERIALS STANDARDS

ASTM A 36/ASTM A36M - Standard Specification for Carbon Structural Steel.

ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

ASTM A 792/A 792M - Standard Specification for Steel Sheets, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

ASTM D 635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

ASTM D 1929 – Standard Test Method for Ignition Properties of Plastics.

ASTM D 2843 – Standard Test Method for Smoke from the Burning or Decomposition of Plastics.

ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

ASTM E 1592 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure difference.

DESIGN REQUIREMENTS

Codes and Standards: Design structural systems according to professionally recognized methods and standards, and the Florida Building Code 2007 (FBC) current revision.

Professional Engineering: Design under supervision of professional engineer licensed in the State of Florida.

Design Loads: Per Building Code: FBC 2007 as revised. Loading criteria are published in Structural drawings.

Factory Mutual - Design project to comply with requirements for Class 1 Fire and I-120 Windstorm Classification.

Anchor Bolts: Furnish anchor bolt diameters, calculated on the basis of stress in the steel bolt, to resist the column reactions induced by the design loads on the structure. Anchor bolts and embedment requirements furnished by others.

SUBMITTALS

Design Data: Provide signed and sealed design criteria and structural calculations per "Design Requirements" article of this specification.

Certification: Manufacturer certification that the building conforms to the contract documents and manufacturer's standard design procedures.

Shop Drawings: Show building layout, primary and secondary framing member sizes and locations, cross sections, and product and connection details. Drawings shall be signed and sealed by design engineer per "Design Requirements" article of this section. include anchor bolt layout drawings with bolt diameters.

Product Data: Information on manufactured products to be incorporated into the project.

Color Charts and Panel Samples: Furnish complete charts for selection of colors, and 12" length x full panel width sample of panel material coated with specified finish, any color.

Submit Specimen Warranty for review.

WARRANTY

Provide manufacturer's standard warranty for the following: Standard warranty on materials and workmanship for a period of 3 years; panel finish warranty for a period of 20 years; and Weathertightness warranty for a period of 20 years.

QUALITY CONTROL

Welding: All welding operators and processes shall be qualified in accordance with the American Welding Society "Structural Welding Code", AWS D1.1.

Manufacturer must be certified by AISC in the Metal Building category.

Supplier must be a primary manufacturer of frames, secondary steel, roof sheeting and trim.

PART 2 PRODUCTS

MANUFACTURERS

Basis of Design: Varco-Pruden (VP Buildings, Inc.) with SSR roofing panels.

Acceptable Manufacturers offering products which may be incorporated into the Work include, but may not necessarily be limited to the following:

Butler Manufacturing Co., MBCI

METAL MATERIALS

Select materials and material yield strengths based on building design requirements; use the following unless required otherwise.

Structural Steel Plate, Bar, Sheet, and Strip for Use in Bolted and Welded Constructions: ASTM A 572, A 1011, A 529, ASTM A 1008 with minimum yield strength of 50,000 psi.

Structural Steel Material for Use in Roll Formed or Press Broken Secondary Structural Members: ASTM A 1011,or A 1008 with minimum yield strength of 55,000 psi.

Galvanized Steel Sheet for Roll Formed or Press Broken Roof and Wall Coverings, Trim and Flashing: ASTM A 653, with minimum yield strength of 50,000 psi. Coating Designation G-90.

Galvalume Steel Sheet Used in Roll Formed or Press Broken Roof Covering: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, with minimum yield strength of 50,000 psi; Coating designation AZ50 for painted panels and AZ55 for unpainted panels.

Hot Rolled Steel Shapes: W, M and S shapes, angles, rods, channels and other shapes; ASTM A 572/A 529/A 500 or ASTM A 36 as applicable; with minimum yield strengths required for the design.

Structural Bolts and Nuts Used with Primary Framing: High strength, ASTM A 325.

Bolts and Nuts Used with Secondary Framing Members: ASTM A 325.

Shop Coat: Manufacturer's standard rust inhibitive primer paint; manufacturer's standard color.

KXL Pre-Painted Finish: 1 mil (0.025 mm) 70% Kynar 500 coating on exterior surface. Color: as selected by Architect from manufacturer's full standard or premium lines.

FRAMING COMPONENTS

Primary Framing: Rigid Frame (RF Series) solid web framing consisting of tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns. Provide a clear span that supports the loads at bay spacings indicated.

Purlins: Zee-shaped; 8 ½" and 11 ½" depth as required; with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.

Girts: Zee- or Cee-shaped; 8 ½" and depth as required, with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.

Wind Bracing: Torsional, diaphragm or diagonal bracing in accordance with manufacturer's standard design practices; utilizing rods, cables, angles, and other members, with minimum yield strengths as required for design.

Primary Frame Flange Bracing: Attached from purlins or girts to the primary framing, minimum yield strength as required for design.

Sag Angles and Bridging: Steel angles, with minimum yield strength of 36,000 psi.

Fabrication: Fabricate according to manufacturer's standard practice. Fabricate structural members made of welded plate sections by joining the flanges and webs by continuous automatic submerged arc welding process. Prepare members for bolted field connections by making punched, drilled, or reamed holes in the shop.

Component Identification: Mark all fabricated parts, either individually or by lot or group, using an identification marking corresponding to the marking shown on the shop drawings, using a method that remains visible after shop coating.

Shop Coating: Finish all structural steel members using one coat of manufacturer's standard shop coat, after cleaning of oil, dirt, loose scale and foreign matter.

Package building components for shipping by common carrier.

ROOF AND WALL PANEL COMPONENTS

Roof Panels: Double Lock SSR Standing Seam Galvalume steel Roof Panels; 24" (610 mm) wide net coverage and continuous from eave to ridge up to 50' in length, with 3" (76.2 mm) high major ribs formed with Factory applied sealant at the panel side laps, for field seaming using electrically operated seaming machine. Material thickness shall be determined by project design requirements, but not less than 24 gage design base metal.

Endlaps, Where Required: 4" wide, located near a support member. Staggered at least one purlin space.

Finish: KXL pre-painted finish, standard or premium color as may be selected by Architect

Panel-to-roof purlin structural attachments: SSR clips with movable tabs which interlock with seamed SSR panel ribs and provide for 1-5/8"(37mm) of panel movement in either direction from center of clip to compensate for thermal effects.

SSR Roof design for this project shall meet FM 1-120 Factory Mutual criteria.

Roof System shall be tested and certified by Factory Mutual to meet FM 1-120 wind resistance criteria:

Panels shall have been tested in accordance to ASTM E-1592 and results used in the building design according to the AISI Specification.

Panel fastening to meet uplift requirements shall be based on tested fastener values with appropriate Safety Factors as defined in the AISI Specification.

Purlin strength with the SSR roof panel shall be determined and tested in accordance with AISI procedures.

Ridge Assembly for High End of Slopes: SSR Ridge; draw-formed aluminum seam caps factory-attached to SSR ridge panels that are mechanically field-seamed together along the center of the ridge, utilizing only one weather sealed joint and providing a true expansion joint for panel movement.

Wall Panels: Panel Rib; 36" (915 mm) wide net coverage Galvalume steel panels, with 1-3/16" (30 mm) high major ribs at 12" (305 mm) on center with minor ribs spaced between the major ribs. Material thickness shall be determined by project design requirements, but not less than 24 gage design base metal. Panels set reversed with fasteners in recessed ribs.

Wall Panel side laps: At least one full major rib, with a supporting member bearing edge on the lower panel and an anti-capillary groove on the upper panel.

Endlaps, Where Required: 4" (100 mm) wide, located at a support member.

Crimp panels at the base and notch to match roof panel configuration at the eave.

Cut panels square at each end; provide base trim at sill.

Finish: KXL pre-painted finish, color per Architect's selection.

Tested per ASTM E 283 (Air Infiltration).

Tested per ASTM E 331 (Water Penetration).

Panel Fasteners:

For roof panels: Stainless steel-capped carbon steel fasteners with integral sealing washer.

For wall panels: Hex head, coated carbon steel. Color of fastener heads to match panel color.

Exposed Fasteners: Self-drilling type, of size as required.

Provide fasteners in quantities and location as required by the manufacturer.

Flashing and Trim: Match material and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.

Plastic Parts: Glass fiber reinforced resin or thermoformed ABS (Acrylonitrile-Butidene-Styrene), minimum 1/8" thick, in manufacturer's standard color.

Sealants, Mastics and Closures: Manufacturer's standard type. Provide at roof panel endlaps, sidelaps, and at roof and wall panel rakes, eave, transitions and accessories as required to provide a weather tight roof system; use tape mastic or gunnable sealant at sidelaps and endlaps.

Closures: Formed to match panel profiles; closed cell elastic material, manufacturer's standard color.

Tape Mastic: Pre-formed butyl rubber-based, non-hardening, non-corrosive to metal; white or light gray.

Gunnable Sealant: Non-skinning synthetic elastomer based material; gray or bronze.

Blanket Insulation: Long filament, resilient glass fiber insulation produced in compliance with the NAIMA 202 specifications, with factory laminated embossed white vinyl facing material. Facing permeance in compliance with ASTM E96, 1.00 perm. Composite fiberglass and facing to meet Flame Spread of 25 or less, Smoke Developed of 50 or less, when tested in accordance with UL 723. Provide facing 3" wider on both edges than blanket. Provide blanket width as required for installation. Thermal Resistance: to meet minimum of R-19 @ 75 degrees F mean temperature for walls and roof.

ROOF ACCESSORIES

Eave Gutters: Roll-formed 26 ga. (0.45 mm) steel sheet, with gutter straps, fasteners and joint sealant; manufacturer's standard colors (to be selected).

Downspouts: 4" x 5" (100 mm x 125 mm) in 10' (3050 mm) lengths, with downspout elbows and downspout straps; same color as gutters.

Fire Safety Criteria:

Self-Ignition Temperature: 650 deg F (343 deg C) or greater, when tested in accordance with ASTM D 1929.
Smoke Density Index: 450 or less, when tested in accordance with ASTM E 84, or 75 or less, when tested in accordance with ASTM D 2843.
Extent of Burning: 1" (25.4 mm) or less, when tested in accordance with ASTM D 635.
Rate of Burning: 2.5" (64 mm) per minute or less, when tested in accordance with ASTM D 635.

PART 3 EXECUTION

EXAMINATION

Verify that foundations are installed correctly, and verify that anchor bolts are installed as indicated on anchor bolt shop drawings.

ERECTION

Erect building system in accordance manufacturer's instructions, erection drawings, OSHA regulations and all other applicable erection documents.

Provide temporary bracing, shoring, blocking, bridging and securing of components as required during the erection process.

END OF SECTION 13121