

SECTION 13121

PREFABRICATED METAL BUILDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and erect a prefabricated metal building complete with all accessories and components necessary for a weather-tight metal building complete in place as indicated on the Drawings and specified herein, including but not limited to
 - a. Structural framing
 - b. Roofing
 - c. Siding
 - d. Exterior doors, door frames, hardware and accessories
 - e. Gutters and downspouts
 - f. Accommodations for ventilation equipment and plumbing facilities
 - g. Insulation
 - h. Fasteners
 - i. Sealants
 - j. Connections to foundation structure
 - k. Coatings
 - l. All appurtenances, accessories and miscellaneous items of work, complete in place

B. Additional Requirements Specified Elsewhere

1. Section 01340: Shop Drawings, Product Data, and Samples
2. Section 01400: Quality Control
3. Section 01600: Materials and Equipment

C. Related Requirements Specified Elsewhere

1. Section 02372: Drilled Caissons
2. Section 03300: Cast-In-Place Concrete
3. Section 03600: Grout
4. Section 05500: Metal Fabrications
5. Section 05501: Anchor Bolts and Drilled-In Anchors
6. Section 06100: Carpentry
7. Section 07200: Insulation
8. Section 07501: Metal Roof and Wall Panels
9. Section 07600: Flashing and Sheet Metal
10. Section 07900: Joint Sealants
11. Division 8: Doors and Windows
12. Division 9: Finishes
13. Division 15: Mechanical
14. Division 16: Electrical

1.2 QUALITY ASSURANCE

A. Reference Standards: Conform to current conditions of the following specifications and standards relating to work of this section

1. American Institute of Steel Construction
 - a. "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" complete with commentary and supplements
2. American Iron and Steel Institute (AISI)
 - a. "Specification for the Design of Cold-Formed Steel Structural Members"
 - b. "Design of Light Gage Steel Diaphragms"
3. American Welding Society
 - a. "Structural Welding Code"
4. Metal Building Manufacturer's Association (MBMA)
 - a. "Recommended Design Practices Manual"
 - b. "Recommended Code of Standard Practice"
5. Pikes Peak Regional Building Department, 2011 Edition

B. Design Criteria

1. Design criteria, rationally applied to structures and their components, shall conform to applicable sections of the publications referenced herein with regards to design requirements and allowable stresses
2. Structural mill sections and welded-up plate sections: Paragraph 1.2.A.1.a of this section
3. Cold-formed steel structural members: Paragraph 1.2.A.2.a of this section
4. Primary and secondary members and coverings: Paragraphs 1.2.A.4.a and 1.2.A.5 of this section using the following design criteria
 - a. General: Conform to requirements of the Pikes Peak Regional Building Department
 - b. Snow load: 30 psf
 - c. Basic wind speed (3-second gust): 100 mph
 - d. Seismic loads
 - 1) Importance factor: 1.25
 - 2) Site class: D
 - 3) Seismic design category: B
 - e. Additional dead and live loads for HVAC equipment, electrical equipment and future office framing in magnitudes and at locations as indicated on the Drawings
 - f. Accommodations for future expansion of building with the same or similar structural system

C. Design Basis

1. Varco-Pruden, Memphis, Tennessee
2. Equivalent products of other manufacturers may be accepted subject to compliance with design, function, materials and performance of the specified items

- a. Compliance shall be determined by the Engineer based upon review of proposed materials, fabrications, erection details and conformance with design and construction drawings and specifications
- b. It will be the manufacturer's or supplier's responsibility to coordinate and furnish, for review by the General Contractor, Engineer and Owner, complete product data and specifications demonstrating complete conformance with the specified items

1.3 SUBMITTALS

- A. In Accordance with Section 01340
- B. Manufacturer's Literature and Drawings
- C. Shop Drawings and Product Data
 1. Submit complete fabrication, assembly, foundation and erection drawings
 2. Submit detailed specifications and data describing materials, parts, devices and accessories
 3. Submit data for verification of compliance with specifications and to illustrate construction and assembly of products
 - a. Dimensions
 - b. Materials
 - c. Thickness or gages
 - d. Fasteners
 - e. Finishes
 - f. Heat transmission ("U" values)
 4. Door rough opening and finish details
- D. Foundation Design Data
 1. Rigid frame and internal column reactions, horizontal and vertical for all applicable load cases
 2. Anchor bolt setting drawings and details including size, location and projection required for all anchor bolts
 3. Review anchor bolt patterns shown on the Construction Drawings and accommodate adaptation of frame base plate bolt pattern with proposed construction
- E. Samples
 1. Manufacturer's complete line of available colors and patterns for wall panels, infill panels, fascia panels and accessories for color selection
- F. Certifications
 1. Design calculations or letter of design certification signed and sealed by a Professional Engineer licensed in the State of Colorado for the structural framing, covering panels and the foundation design criteria for the metal building system

2. Design calculations may be manual or computer generated at the discretion of the prefabricated metal building system manufacturer
 - a. Design data, calculations and supporting data shall be acceptable to the Pikes Peak Regional Building Department

G. Building Permit

1. Furnish and submit all required documents to the Pikes Peak Regional Building Department
2. Coordinate as necessary to obtain all required permits

1.4 DELIVERY, STORAGE AND HANDLING

- A. Protect all equipment and materials for damage during handling, delivery and storage
- B. Equipment or material which is damaged during handling, delivery and storage or is damaged by the elements shall be restored to new conditions prior to installation or replaced

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

A. Prefabricated Metal Building

1. Structural type: Clear span, rigid frame, peak roof with outset girts
2. Roof slope: 3 to 12 unless otherwise indicated on the Drawings
3. Size
 - a. Building sizes vary; see Construction Drawings
 - b. Bay sizes typically not to exceed 25' plus manufacturer's standard endwalls
 - c. Eave height: Varies; see Construction Drawings
4. Rigid frame and columns; see Construction Drawings

2.2 MATERIALS, FABRICATION AND MANUFACTURE

A. Fabrication

1. Shop fabricate primary and secondary framing members complete with base, cap, splice and stiffener plates as applicable, factory welded into place
2. Factory punched bolt connection holes for field assembly of all components of various systems

B. Welding

1. In accordance with AWS "Structural Welding Code"
2. Furnish certifications of welder qualifications if requested by the Owner

C. Bolting

1. High strength bolts (ASTM A325) for field assembly of frame members
2. Anchor bolts in accordance with Section 05501-Anchor Bolts and Drilled-In Anchors as required and as indicated by the prefabricated metal building manufacturer's anchor bolt layout drawings
 - a. Embedded anchor bolts are required for intermediate and endwall base plate anchorage; drilled-in and adhered anchors are not acceptable

D. Primary Framing

1. Rigid Frames
 - a. Columns, roof beams and internal columns where applicable complete for bolted field assembly
 - b. Shop fabricated bases
 - c. Provide interior or intermediate structural frame at designated endwall to accommodate future building extension
2. Endwall
 - a. Corner columns, roof beams and endwall columns complete for bolted field assembly
 - b. Shop fabricated bases
3. Columns and rafters may be either uniform depth or tapered
4. Hot rolled structural sections: ASTM A36
5. Built-up steel sections
 - a. Plates and bars: ASTM A572, Grade 50
 - b. Sheet and strip: ASTM A607, Grade 50
 - c. Minimum yield stress: 50,000 psi

E. Secondary Structural Members

1. Purlins: Cold-formed "Z" shaped members
2. Girts: Cold-formed "Z" shaped sections
3. Eave struts: Cold-formed stiffened channel sections to provide adequate backup for both roof and wall panels at the building eaves
4. Base angle provided for attachment of wall covering to foundation wall, secured in place with contractor furnished expansion anchors
5. Bracing: Provide all diagonal bracing, flange braces, sag rods, bevel washers, etc., of sizes and shapes as required by design loading specified
6. Intermediate bracing: Provide all intermediate bracing between columns to support HVAC and electrical gear as indicated on the Construction Drawings

F. Structural Painting

1. Cleaning: Factory clean all structural steel components to remove all loose dirt, grease and mill scale and chemically treat with phosphoric type cleaner
2. Painting: Factory prime with rust inhibitive primer compatible with specified finish coating system per Section 09900
3. Abrasions caused by handling shall be touched up in the field using manufacturer furnished primer compatible to shop primer
4. Finish coat all structural framing members prior to installation of roof and wall panels

- a. Factory or field finish coating acceptable
- b. Coatings in accordance with Section 09900

G. Roof Panels

1. See Section 07501-Metal Roof and Wall Panels
2. Design Basis: Met-Tile, Inc. Met-Tile roofing system

H. Wall Panels

1. See Section 07501-Metal Roof and Wall Panels
2. Design Basis
 - a. Varco Pruden "Texture Clad" wall system
 - b. Custom Panel Systems "Stucco Building Panel" system

I. Accessories

1. Trim and accessories: See Section 07501-Metal Roof and Wall Panels
2. Closures: See Section 08710-Finish Hardware
3. Gutters: See Section 07501-Metal Roof and Wall Panels
4. Downspouts: See Section 07501-Metal Roof and Wall Panels
5. Hollow metal doors and frames
 - a. See Section 08100-Metal Doors and Frames
 - b. See Construction Drawings for each specific building requirements
6. Hardware: Each door
 - a. See Section 08710-Finish Hardware
 - b. See Construction Drawings for each specific building requirements
7. Insulated overhead steel door: See Section 08301-Overhead Sectional Doors
8. Provide framing as required for blockouts and/or penetrations for installation of HVAC equipment by others
 - a. Size and location of blockouts as indicated on the Drawings and/or as specified to accommodate equipment furnished and installed
9. Grout: See Section 03600-Grout

J. Wall and Roof Insulation

1. Material
 - a. Noncombustible material
 - b. Batt, blanket or rigid insulation may be used
 - c. Faced with vapor barrier placed toward interior of the building
 - d. Combination assembly including vapor barrier facing shall carry a U.L. Fire hazard Classification indicating a flame spread of 25 or less
 - e. Extreme care shall be taken to ensure that a completely un-broken vapor barrier is in place throughout the building walls and roof
 - f. Rigid insulation design basis: Insulated Panel Systems, Inc., Houston, Texas
2. Thickness as required to provide R-values of
 - a. R-19 in walls
 - b. R-30 in the roof

K. Sealants

1. Refer to Section 07900 - Joint Sealants
2. Standard of quality of a reputable and established sealant manufacturer, approved by the manufacturer of the prefabricated metal building
3. Sealants shall have good cohesion as well as good adhesion to the protective coated metal and shall not be corrosive to any components on which it is applied
4. Adequate handling characteristics during normal ranges of construction/erection temperatures
5. Retain weather sealing properties under conditions for which it is applied
6. Material
 - a. Extrudable sealant of the non-migratory, non-drying and non-skinning type
 - b. Synthetic elastomer base material conforming to the National Association of Architectural Manufacturer's (NAAMM) Standard SS-1a
 - c. Except for "tack-free-time" conform to performance requirements of Fed. Spec. TTC-598-b, Type I
 - d. Application
 - 1) Factory-applied or field-applied sealant in longitudinal ribs of panels
 - 2) Spot-sealing laps (where applicable) of roof panels
 - 3) Spot-sealing trapezoidal corrugated-nestable panels

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine concrete foundation and anchor bolt layout for conditions or defects that will adversely affect execution, permanence or quality of the work
- B. Do not begin erection of prefabricated metal building until unsatisfactory conditions are corrected

3.2 ERECTION

- A. Erection of prefabricated metal building shall be conducted by the manufacturer's authorized erection representative in strict accordance with
 1. Manufacturer's shop and erection drawings and
 2. Accepted trade practices as outlined in the MBMA "Code of Standard Practice"
- B. Confirm furnishing and installation of embedded anchor bolts with foundation construction
 1. If necessary, adapt frame base plates to conform to bolt material and pattern that exist in the foundation
- C. Conform to erection tolerances set forth in the AISC Code except individual member shall be considered plumb, level and aligned if the error does not exceed 1:300
- D. Erect all components and accessories of the system as specified to assure that the building shell is complete and weathertight

- E. Remove all rubbish and debris resulting from erection work and leave installation ready for acceptance
- F. Seal all wall and roof penetrations to assure a complete, weathertight installation
 - 1. Keep exterior steel wall and roof panel penetrations to a minimum in number and size

END OF SECTION