City of Prescott Building Division
Community Development Department
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METAL BUILDINGS Structural Technical Guideline

PRE-ENGINEERED METAL BUILDING CODE REQUIREMENTS (PEMB):
The Building Code covers requirements for data submitted for review prior to issuance of a permit for a building or structure (Section 106.1). These provisions are as applicable to metal buildings as any other type of building construction.

However, due to the different methods used in the contracting and supplying of metal buildings (Manufacturers vs. site contractors, lack of architect, out-of-state interests, etc.), a specific list of data requirements is usually helpful. These requirements are what would normally be produced by the professional architect or professional engineer charged with the design of a PEMB building. PEMB requires that the Metal building and footings are engineered. See Pre-application conference letter for all additional site plan requirements.

1. **DRAWINGS**
   Minimum submission must include site plan, floor plan, foundation plan, roof framing plan, wall elevations including all window and door openings, cross section, and framing details. All drawings and calculations must be signed and sealed by an Arizona registered professional engineer or architect.

   a. **Site Plan:** A site plan showing all actual and assumed property lines, utility locations, dimensions from buildings to property line or fire separation line used, location of the building and all other structures including, Retaining walls, fencing, out buildings, carports, lighting, easements, and parking areas.

   b. **Floor Plan:** Please provide a Code Summary Floor Plan(s) designated as CS (Code Summary) to include:
      i. A basic floor plan for each level, showing partitions, stairs, doors with door swings, fixtures, etc. The function and Occupancy load factor used for each room, area or floor. Minimum scale is 1/8” = 1’-0”.
      ii. Occupancy Classification: Clearly identify the building's occupancy group (e.g., Group A - Assembly, Group B - Business, etc.) and any sub-groups.
      iii. Construction Type: Specify the building's construction type (e.g., Type I, Type II, etc.) based on fire resistance requirements.
      iv. Fire Protection: Detail fire protection measures, including fire walls, fire barriers, fire-rated construction, and sprinkler systems.
      v. Means of Egress: Outline the building's means of egress, including exit paths, stairways, and fire escape routes.
      vi. Accessibility: Indicate compliance with accessibility standards, such as those outlined in Chapter 11 of the IBC and A117.1-2017.
      vii. Energy Conservation: Note compliance with energy conservation standards, particularly for heating, ventilation, and air conditioning.
      viii. Life Safety: Summarize measures to ensure life safety, including fire alarms, emergency lighting, and other related systems.

c. **Foundation plan:** must show size of footing, size and extent of the steel and dimensions of all concrete. Anchor bolt locations and column reactions may be on an additional sheet prepared by the building manufacturer. If not, they must be shown on the foundation plan. Must provide overturning calculations.

d. **Roof framing plan:** line diagram must show all structural framing, beams, columns, purlins, struts, X-bracing, and other secondary framing required to provide a complete structure. Members may be called out by shop piece mark rather than by structural size. However, if this is done a cross-reference table must be provided on the same sheet so that the dimensions and properties of all load-bearing members can be located easily and identified.

e. **Wall framing elevation:** line diagrams like the roof framing plan that call out or reference the size of all structural wall framing, opening such as windows and doors and cross bracing locations.

f. **Cross section:** must show clearly the primary structural frame that will be used on the submitted building, including base, haunch, and ridge plate connections. The size of all web and flange members must be noted as well as all bolts and welding. Height, width and depth of all members must be dimensioned clearly. Any clips or connections welded to the frame at the manufacturer's plant must be shown. The ASTM designations and yield stress of material used must be indicated.

g. **Framing details** should include details and connections of all other load-bearing structural members, including end walls, canopy beams, lean-tos, crane brackets, etc.

2. STRUCTURAL CALCULATIONS AND INSPECTIONS

The minimum submission must include analysis and design of the roof and wall sheeting, secondary framing, primary rigid framing, end-wall or wind column design, and longitudinal wind load design. Design dead load must be broken down to components, such as roofing, deck, purlins, ceiling, allowance for sprinklers, mechanical systems, if any, and shown on plans.

Design live, wind and seismic loads must conform to Chapter 16 of the City of Prescott 2024 International building Code adoption and site specific report from ASCE Hazard Tool, including ground snow load (reducible for roof snow load with Calculations), Wind loading per ASCE-7-22 with exposure 'C', Seismic per ASCE 7-22 for risk category and site class as determined by soils report. **Special inspection forms and reports are required for all Concrete, welding and epoxy bolts and/or other items as determined by Engineer of record and 2024 IBC Table 1705.2.6**.

a. **Roof and wall sheathing** design must show the shape, dimensions, section properties and yield stress of the particular decking being used. If standard sheets are submitted, the particular gage must be identified as well as figures showing that the load carrying capabilities exceed the actual vertical or horizontal loads.

b. **Secondary framing** design must indicate the size, shape, and section properties of all light gage purlins and girts. Standard sheets may be utilized if the actual loading and span of the submitted members are indicated and calculations show that the standard members are adequate to support the loads.

c. **Primary rigid framing** design may be a hand analysis or a computer programmed design based on virtual work, slope deflection, energy equations, column analogy (elastic weights), or finite element analysis. Other recognized methods of analysis may be accepted at the discretion

of the Building Official. All computer printouts must be for the particular building submitted and must indicate all dimensions, loading and loading combinations as well as size and geometrical and section properties of members designed. Both vertical and horizontal reactions at base must be diagrammatically shown, or clearly identified. Calculations must be provided for all base, haunch and ridge plate connections as well as canopy beams, lean-tos, portal bents and other special structural members.

d. **Endwall design** must be complete and include beams, columns and bracing. Calculations on columns must include combined axial and bending stresses. Where a full frame is used in the endwall, columns may be designed for wind load only. Design shall include calculations on end-wall rod bracing.

e. **Longitudinal wind load design** must indicate the method of transferring end-wall wind load to sidewall foundations. Either rod bracing or portal bracing methods are acceptable. Vertical diaphragm method may be used if substantiating data, either calculation or test, is submitted, together with proper diaphragm detailing. Calculations must show how wind load is transferred to the eave strut. The design of all portal connections