SECTION 13 34 00

ENGINEERED POST FRAME STRUCTURES

This Section includes notes to assist the user in editing the Section to suit project requirements. These notes are included as hidden text and can be revealed or hidden by one of the following methods:

Click the Show/Hide icon ¶ on the Standard toolbar.

Keyboard shortcut Ctrl+Shift+8.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Engineered wood-framed structures consisting of the following components:
      a. Factory-engineered wall columns.
      b. Factory-engineered roof truss.
      c. Factory-engineered metal [**roof**] [**and**] [**wall**] panels.
      d. Factory-engineered building system accessories including doors and windows.
      e. Prefinished metal trim items.
      f. Prefinished ridge vents and soffits.

1.2 REFERENCES

A. Reference Standards:
   1. Preservative Treated Lumber:
      a. American Wood Preservers Association (AWPA).
   2. Lumber grading rules and wood species:
      a. National Design Specifications for Wood Construction, current edition.
      b. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
      c. Southern Pine Inspection Bureau (SPIB): Southern Pine.
      d. West Coast Lumber Inspection Bureau (WCLIB): Douglas Fir.
      e. Western Wood Products Association (WWPA): Douglas Fir and Ponderosa Pine.
   3. MSR Lumber Producers Council (MSR) for machine stress rated lumber.
   4. National Design Specifications for Wood Construction.
   5. National Design Standard for Metal Plate Connected Wood Truss Construction (TPI).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-engineered product. Indicate component materials, dimensions, profiles, and construction and installation details.
   1. Include information for specialty accessory products specified for this Project.
   2. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   3. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.
   4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Sizes, stress grades, and species of lumber.
   2. Anchor-bolt layout.

3. Structural Framing Drawings: Show complete fabrication of primary and secondary framing. Include provisions for openings and the following information:
    a. Slope or depth, span, and spacing of truss.
    b. Heel bearing height.
    c. Design loading to include:
        1) Top chord live load.
        2) Top chord dead load.
        3) Bottom chord dead load.
        4) Concentrated loads and their points.
    d. Adjustments to lumber and plate design values for conditions of use.
    e. Plate type, thickness of gauge, and size.
    f. Lumber size, species and grade for each member.
4. Metal [**Roof**] [**and**] [**Wall**] Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Indicate the following components:
    a. Roof mounted items.
    b. Wall mounted items.
5. Submit Shop Drawings that have been engineered and certified by professional engineer licensed in the State in which Project is located. Include seal and signature of professional engineer on Shop Drawings.

C. Design Data: Truss engineering calculations for loading and stresses, bearing seal and signature of professional engineer licensed in the State in which Project is located. Include the following calculations:
1. Minimum design shall meet design standards of latest edition of International Building Code unless other, more stringent requirements are in force in Project location.
2. Bending moments and axial forces for each member.
3. Basic plate design values.
4. Design analysis for each joint indicating that proper plates have been used.
5. Provide design calculations for exterior walls, canopies, soffit systems, and lateral bracing walls. Design wind loads and lateral bracing loads are indicated on structural Drawings.
6. Submit design calculations that have been engineered and certified by professional engineer licensed in the State in which Project is located. Include seal and signature of professional engineer on calculations

D. Samples for Initial Selection: For units with factory-applied color finish, color chart of manufacturer's standard colors.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated wood.
2. Engineered wood products.

B. Quality Control Submittals:
1. Test Reports: Certified test reports showing compliance with specified performance characteristics.
2. Certification: Manufacturer’s certification that Products furnished meet specified design and performance criteria.

C. Submit written proof of third party inspection program in force for truss manufacturer used on Project.

D. Certifications: Certify that specified roof and wind load requirements are met.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with minimum 5 years’ documented experience that participates in recognized quality-assurance program that complies with quality-control procedures

and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Manufacturer shall have engineering department.
3. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by qualified professional engineer.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Source Limitations: Obtain engineered post frame building components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store materials per manufacturer's requirements.

B. Handle and store trusses to comply with recommendations in TPI BCSI**,** "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
3. Provide for air circulation around stacks and under coverings.
4. Store trusses to avoid contact with other materials that could create staining or discoloration.

C. Inspect trusses upon deliver to Project site and notify manufacturer immediately if members have damage from handling or show discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.7 WARRANTY

A. Manufacturer's Special Warranty – Treated Material: Manufacturer agrees to repair, restore, or replace columns that fail in materials within specified warranty period.

1. Warranty Period: 50 years from date of Substantial Completion.
2. Manufacturer shall repair treated structural columns that fail because of insect damage or because of decay that occurs under normal conditions and proper use. If manufacturer is not able to repair structural posts to satisfaction of Architect and Owner, manufacturer shall replace damaged treated structural columns.

B. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes the following:
   a. Color fading more than 5 Hunter units when tested per ASTM D2244.
   b. Chalking in excess of a No. 8 rating when tested per ASTM D4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: From date of Substantial Completion, 40 years on chalk; 30 years on color change:
3. Warranty Exclusions: Manufacturer will not warrant metal panel finishes damaged due to exposure to atmospheric pollutants including animal waste or other corrosive conditions. Manufacturer will not warrant labor by others.
4. Manufacturer shall repair painted steel roofing or siding panels if the paint peels, cracks, checks, flakes or blisters to an extent that is apparent by ordinary outdoor visual observation when exposed to normal weather and atmospheric conditions. If manufacturer is not able to repair steel panels to satisfaction of Architect and Owner, manufacturer shall replace damaged steel panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products from the following manufacturer:
Energy Panel Structures, Inc.
102 East Industrial Park
Graettinger, IA 51342
Toll Free: 800.967.2130
Fax: 712.859.3275
Email: sales@epsbuildings.com
Website: www.epsbuildings.com

2.2 PERFORMANCE CRITERIA

A. Design Requirements:
1. Design wood members per formulas published in National Design Specifications (NDS) for Wood Construction.
2. Design light meta-toothed connector plates and joint design in compliance with Truss Plate Institute's (TPI) National Design Standard for Metal Plate Connected Wood Truss Construction.
3. Include unbalanced roof loads required by ASCE-7, current edition.

2.3 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Maximum moisture content of 19 percent or per appropriate grading rules. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of inspection agency approved by ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
1. Laminated columns.
2. Baseboards.
3. Hold down blocks.

2.4 MATERIALS - WOOD

A. Laminated Columns: Factory-fabricated from minimum 3 ply 2 inch by 6 inch #1 or better southern yellow pine.
1. Columns to 20 Feet Lengths: Full-length (unspliced) nail laminated plys. Provide middle ply with short truss support block.
2. Columns over 20 Feet Lengths: Spliced laminated plies per approved Shop Drawings and manufacturer's design.
3. Preservative-Treatment: Treat portions of columns designed to be in contact with ground to net retention of 0.60 pounds per cubic foo of CCA per AWPA U1 requirements.

B. Wood Trusses: Factory-fabricated of surfaced lumber.
1. Lumber:
a. Top and Bottoms Chords: No. 1 or better Southern yellow pine or comparable Spruce-pine-fir.

b. Webs: No. 2 or better Southern yellow pine or SPF.

2. Metal Connector Plates: Fabricated from ASTM A653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A); G60 hot-dip galvanizing coating designation.
   a. Plate Thicknesses: 0.036 inch and 0.0556 inch thick.

C. Baseboards: 2 inch by 8 inch No. 2 or better Southern yellow pine, tongue-and-groove.
   1. Preservative-Treatment: Treat baseboards for ground contact conditions. per AWPA U1 requirements. Preservative shall penetrate 100 percent of sapwood.

D. Wall Girts: 2 inch by 6 inch girts, No. 1 or better Southern yellow pine.

E. Purlins and Truss Ties: 2 inch by 4 inch laid on edge, MSR SPF 1650.
   1. Purlins may be installed over top chord of truss, flat, or in purling hangers. Where purlins and truss ties are set in hangers, provide 2 inch by 6 inch laid on edge, MSR SPF 1650 or No. 1 or better Southern yellow pine.

F. Overhang Framing: Fabricated rafter frames.
   1. Provide factory beveled facia boards, 2 inch by 6 inch Spruce-pine-fir, No. 2.

G. Wind Bracing:
   1. 2 inch by 6 inch, No. 2 or better Spruce-pine-fir from end wall column to first truss back.
   2. 2 inch by 4 inch diagonal in roofline bracing as required by design.

H. Framing Around Openings:
   1. Provide 2 inch by 6 inch/2 inch by 4 inch No. 2 around door, window, and overhead sectional door openings.

I. Headers: Provide built-up No. 1 or better Southern yellow pine headers as required to meet loading designs.

J. Incidental Framing: No.2 or better 2 inch by 4 inch.

2.5 MATERIALS – PREFINISHED MATERIALS

A. General: Factory-formed metal panels, roll-formed in manufacturer's facility, designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Metal Panels: Exposed-fastener metal [**roof**] [**and**] [**wall**] panels, formed with raised ribs and recesses.
   1. Material: Zinc-coated (galvanized) steel sheet, 0.0125 inch nominal thickness.
      a. Exterior Finish: Siliconized polyester.
      b. Color: Selected by Architect from manufacturer's full range.
   2. Rib Spacing: 2 major ribs at 9 inches on center. 2 minor ribs at 3 inches on center between major ribs.
   3. Panel Coverage: 36 inches.
   4. Panel Height: 3/4 inch.

C. Wainscoting: 36 inch high accent feature from at base of building, consisting of the following material:
   1. Steel panel matching specified wall panels.
   2. Concrete Siding Units: Provide concrete wainscot manufacturer's recommended materials for a complete wainscot system.
      a. Basis-of-Design Product:
         1) Alliance Concrete Concepts: Moderra Block Wainscot.
   3. Mortarless Concrete Brick Units: Provide concrete wainscot manufacturer's recommended materials for a complete wainscot system.
      a. Basis-of-Design Product:
         1) Nova Brik MidAmerica: Novabrik Mortarless Brick Siding.

D. Metal Trim: Match material and color of metal panels. Provide trim for corners, ridge lines, rakes, eaves, and panel bases.
   1. Lengths: Minimum 10 feet .
   2. Trim, overhang facias, track covers, and slide door jambs available in building panel covers.
   3. Overhead Sectional Door and Slide Door Jamb Trim: Fabricated from 1 piece up to 10 feet in length.

E. Soffits: Aluminum or steel, vented as required. Colors shall match roof and wall panel colors.

F. Ridge Vent: Manufacturer's standard pre-engineered ridge cap or ridgelite, flashings, and eave and gable trim. Field-fabricate minor flashings as indicated on approved Shop Drawings.
   1. Provide manufacturer's [**standard ridge vents**] [**profile vent**] [**cupola**] as indicated on Drawings

Continuous Vented Ridge	12 square inches per lineal foot
Cupola	Total Vent Area
24 inch	250 square inches
36 inch	560 square inches
48 inch	990 square inches

2.6 RELATED MATERIALS

A. Insulation: Where indicated on Drawings, provide one or more of the following insulation types.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
   1. Surface Burning Characteristics per ASTM E84:
      a. Flame Spread: 25.
      b. Smoke Developed: <50.
   1. Thermal Resistance and Thickness: [**R-11, 3 inch**] [**R-19, 6 inch**] and [**R-25, 9 inch**].

C. Polypropylene-Scrim-Kraft-Faced, Glass-Fiber Blanket Insulation: ASTM C665, Type II, Class A; Category 1, with 4 mil white, high density polyethylene facing.
   1. Acceptable Product: Tuff-Roll Insulation.
   2. Surface Burning Characteristics per ASTM E84:
      a. Flame Spread: 25.
      b. Smoke Developed: <50.
   3. Thermal Resistance and Thickness: R-6, 3 inch.
   4. Physical Properties:
      a. Water Vapor Transmission, ASTM E96: 0.015 perms.
      b. Light Reflectivity, ASTM C 523, Illuminant D-6500: 90 percent.

D. Glass-Fiber Loose-Fill Insulation: ASTM C764, Type I for pneumatic application.
   1. Surface Burning Characteristics per ASTM E84:
      a. Flame Spread: 5.
      b. Smoke Developed: 5.

E. Anti-Condensation Felt: Manufacturer's shop-applied, proprietary, self-adhered felt designed to trap condensation moisture and release moisture as humidity.
   1. Acceptable Product: DripStop by Filc d.d.

F. Walk Doors: Where indicated on Drawings, provide the following type of doors:
   1. Steel or extruded aluminum frame and sash with electrostatically coated enamel paint finish and window manufacturer's standard single pane glass or insulated glass unit, and locking options based on Project requirements.
      a. Acceptable Product:
         1) AJ Manufacturing: 7100 Series Commercial Post Frame Entry / Walk Doors.
         2) AJ Manufacturing: 5100 Series Commercial Post Frame Entry / Walk Doors.

G. Windows: Where indicated on Drawings, provide the following type of windows:
   1. Thermally insulated extruded aluminum frame and sash with electrostatically coated enamel paint finish and window manufacturer's standard insulated glass units.
      a. Acceptable Products:
         1) AJ Manufacturing: Series 900 Window with EZ Fit Trim.

H. Closure Strips: Closed cell, 2 psf density polyethylene foam, premolded to match configuration of panels.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153.
   2. Exposed Fastener Heads: Match color of steel panel.
   3. Where steel panels or trim is attached to preservative-treated lumber, provide fasteners of unpainted Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F1667.
   1. Framing Lumber: 10d, 16d and 60d ring shank nails.
   2. Machine Bolts: Minimum grade 1, A307.
   3. Metal Panels: Minimum 1-1/2 inch No. 10 screw fasteners with EPDM sealing washers bearing on weather side of metal panels.
      a. Match color of metal panels.

2.8 FABRICATION

A. Shop-fabricate wood trusses in TPI inspected plant.

B. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

C. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

D. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
   1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

E. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
   1. Engage land surveyor to perform surveying.

C. Verify that mechanical and electrical utilities are in correct position.

D. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent framing, connections, and bracing are in place unless indicated otherwise.

3.3 ERECTION OF FRAMING

A. General: Do not use materials that are unsound, warped, improperly finished, or with defective surfaces, sizes, or patterns.
   1. Comply with frame manufacturer's approved Shop Drawings for details and building erection.
   2. Comply with NFBA document “Accepted Practices for Post-frame Construction Framing Tolerances.”

B. Columns:
   1. Auger hole to depth of diameter indicated on Drawings.
   2. Pour ready mix concrete pad in bottom of each hole per Drawings.
   3. Install hold down blocks at bottom of each column per approved Shop Drawings.
   4. Accurately position column in hole.
   5. Backfill with dry soil compacted in 8 inch lifts.

C. Baseboards: Install [**1 run**] [**2 runs**] of 2 inch by 8 inch tongue-and-groove plank, at grade, using manufacturer recommended fasteners.

D. Wall Girts: Install at centers indicated on Drawings.
   1. If required, install overhang framing at top of wall girts.

E. Trusses:
   1. Set trusses in place in center of column using lifting methods as approved by manufacturer.
   2. When trusses are properly positioned, install 1/2 inch by 5-1/2 inch machine bolt and manufacturer recommended 20d ring shank nails through 2 of column laminates and truss heel.
   3. Brace trusses per WTCA guidelines and BCSI Manual

F. Purlins: Install purlins with fasteners and at spacings per approved Shop Drawings.

G. Truss Ties: Install truss ties at locations recommended by structure manufacture and per approved Shop Drawings
   1. Run truss ties from end wall to end wall.

H. Incidental Framing: Install 2 inch by 4 inch or 2 inch by 6 inch blocking as required per structure manufacturers recommendations.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Install metal panels per manufacturer’s established construction procedures.

B. Install metal panels and components plumb, square, straight, and true to lines, and to assure freedom from rattles.

C. Take care when cutting prefinished materials to ensure cuttings do not remain on finished surface.

D. Properly install fasteners taking care to not under- or overdrive.

3.5 METAL PANEL INSTALLATION

A. Roofing Panels: Install panels perpendicular to supports aligned straight with end fascias and fasten to purlins. Anchor with fasteners at spacings recommended by manufacturer and design loads.

B. Wall Panels: Install metal panels perpendicular to wall girt and purlin supports, aligned level and plumb. Anchor with fasteners at spacings recommended by manufacturer and design loads.

C. Vented Ridges: Fasten vented ridges to structure as indicated on Drawings, maintaining manufacturer's minimum clear throat opening.

D. Soffits: Install soffits to interlock with trim items at top of steel siding and at facias.
   1. Solid or optional vented soffit shall be used at end overhang.
   2. A combination of solid and perforated soffits shall be provided for balanced ventilation at side overhangs.

E. Trim Items: Install trim items at base, wainscot transitions, corners, top of steel siding, facia, gables, and ridges using no less than 1 inch screw fasteners.
   1. Trim items shall be installed at the base, at any wainscot transition, corners, top of steel siding, fascias, gables and ridge using appropriate 1" screw fasteners.

F. Closure Strips: Provide closure strips at top and bottom of roofing panels.

END OF SECTION