



SECTION 054400 - PRE-ENGINEERED PRE-FABRICATED COLD-FORMED STEEL TRUSSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-engineered cold-formed steel trusses.
- B. Cold-formed steel framing accessories.

1.2 RELATED SECTIONS

- A. Section 05 30 00 - Metal Decking.
- B. Section 05 40 00 - Cold Formed Metal Framing.

1.3 DEFINITIONS

- A. Truss Component Manufacturer: The maker of the components that will be assembled into trusses by the Truss Manufacturer. See MANUFACTURERS for acceptable Truss Component Manufacturer.
- B. Truss Manufacturer: An individual or organization engaged in the manufacturing of trusses with a minimum of 5 years experience manufacturing trusses for projects of similar size and design. See MANUFACTURERS for acceptable Truss Manufacturers.
- C. Truss Design Drawing: Written, graphic and pictorial depiction of an individual truss.
- D. Truss Design Engineer: Person who is licensed to practice engineering as defined by the legal requirements of the jurisdiction in which the building is to be constructed and who supervises the preparation of the truss design drawings. In this case, the Truss Design Engineer is the Truss Component Manufacturer.
- E. Truss Placement Diagram: Illustration identifying the assumed location of each Truss.

1.4 REFERENCES

- A. ANSI/AISI/COS/S100-07/S2-10: North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2007 edition including the 2010 Supplement.
- B. ANSI/AISI/COFS/S200-07: North American Standard for Cold-Formed Steel Framing - General Provisions; 2007.
- C. ANSI/AISI/COFS/S214-07/S2-08: North American Standard for Cold-Formed Steel Framing - Truss Design; 2007 edition including the 2008 Supplement.

- D. AISI/COFS - Practice Guide - CF06-1: Code of Standard Practice for Cold-Formed Steel Structural Framing; 2006.
- E. ASTM A 370-09 - Standard Test Methods and Definitions for Mechanical Testing of Steel Products; 2009.
- F. ASTM A 500-03a - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003.
- G. ASTM A 653-09 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009.
- H. CFSBCSI - Cold-Formed Steel Building Components Safety Information; Cold-Formed Steel Council (CFSC); 2008 edition with CFSB3 summary sheet insert.
- I. CFSEI Technical Note 551d - Design Guide for Construction Bracing of Cold-Formed Steel Trusses; Cold-Formed Steel Engineers Institute; February 1997.
- J. CFSEI Technical Note 551e - Design Guide for Permanent Bracing of Cold-Formed Steel Trusses; Cold-Formed Steel Engineers Institute; February 1998.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 (Section 01300 IN MF95).
- B. Product Data: Truss Component Manufacturer's descriptive literature for each item of cold-formed metal framing and each accessory specified in this section.
- C. Engineered Truss Design Drawings: Detailed truss shop drawings prepared by Truss Manufacturer and signed and sealed by a Professional Engineer licensed in the State of _____ that are in accordance with AISI references. These drawings may also include referenced detail drawings germane to the trusses.
- D. Truss Placement Diagram: Diagram that identifies the assumed location of each individually designated truss and references the corresponding Truss Design Drawing.
- F. Engineered Permanent Bracing Drawings: Detailed plan drawings, including any referenced detail drawings, prepared by Truss Manufacturer and signed and sealed by a professional Engineer licensed in the State of _____ that are in accordance with CFSEI references including all lateral, diagonal, chord, web, diaphragm, heel and shear bracing or blocking as required per code.
- G. Engineered Connections Drawings: Detailed connection drawings and schedules prepared by the Truss Manufacturer, signed and sealed by a Professional Engineer Licensed in the State of _____ that are in accordance with all AISI/ASTM/CFSBCSI references including all truss-to-truss and truss-to-bearing connections, or any other connections to be made to the truss system.

1.6 QUALITY ASSURANCE

- A. Provide design of trusses by Truss Component Manufacturer, using design methodologies recommended in AISI references.
 - 1. Determine mechanical properties of load bearing components by testing in accordance with ASTM A 370-09.
 - 2. Provide drawings by a design professional registered in the State in which project is to be constructed.
 - 3. Provide Truss Manufacturer's Truss Design Drawings.
- B. Pre-Installation Meeting: Meet at job site prior to beginning of installation to review requirements:
 - 1. Attendees: Require attendance by representatives of the following:
 - a. Installer of this section.
 - b. Other entities directly affecting, or affected by, construction activities of this section, including but not limited to, the following:
 - 1) Installer of truss support framing.
 - 2) Installer of mechanical systems.
 - 3) Installer of electrical systems.
 - 2. Review potential interface conflicts; coordinate layout and support provisions.

1.7 DELIVERY, STORAGE, AND HANDLING OF STEEL TRUSSES

- A. Pack, ship, handle, unload, and lift shop products in accordance with Truss Component Manufacturer's recommendations and in manner necessary to prevent damage or distortion.
- B. Store and protect products in accordance with Truss Component Manufacturer's recommendations and in manner necessary to prevent damage, distortion and moisture buildup.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Truss Component Manufacturer:
 - 1. TrusSteel Products from TrusSteel, An ITW Company; 3208 Fisher Court, Arlington, TX 76001. Tel: (888) 565-9181. www.TrusSteel.com.
- B. Acceptable Truss Manufacturers with a minimum of 5 years experience manufacturing trusses similar to or exceeding project design, size and requirements: Truss components shall be fabricated into completed trusses by the following fabricators:
 - 1. American Panel Tec; 1640 New Market Avenue, South Plainfield, NJ 07080.
Tel: (732) 968-0555; Design@AmericanPanelTec.com ; www.AmericanPanelTec.com
- C. Substitutions: Not permitted.

2.2 COMPONENTS

- A. Pre-Engineered Pre-Fabricated Cold-Formed Steel Trusses: TrusSteel truss components by TrusSteel, An ITW Company, meeting specified requirements.
1. Truss Type, Span, and Height: As indicated on drawings.
 2. Comply with requirements of _____ code.
 3. Deflection Under All Loads: $1/$ _____ th of span, maximum.
 4. Deflection Under Live Loads: $1/$ _____ th of span, maximum.
 5. Shop fabricate in accordance with Truss Design Drawings, using jiggling systems to ensure consistent component placement and alignment of components, and to maintain specified tolerances; field fabrication is strictly prohibited unless performed by authorized Truss Manufacturer using Truss Manufacturer's shop assemblers and proper jiggling systems.
 6. Shop fabrication of other cold-formed steel framing components into assemblies prior to erection is permitted; fabricate assemblies in accordance with shop drawings.
 7. Fasten connections within truss assembly with Truss Component Manufacturer's screws only and as shown on the Truss Design Drawings; welding and other fasteners are prohibited.
 8. Fabricate straight, level, and true, without rack, and to the tolerances specified in ANSI/AISI/COFS/S214-07/S2-08:
- B. Truss Chord and Web Components: TrusSteel components, with rolled or closed edges to minimize the danger of cutting during handling; chord and web components without rolled edges are prohibited.
1. Shapes, Sizes, and Thicknesses: As required to suit design and as indicated on shop drawings.
 2. Chords: Cold-formed from ASTM A 653/A 653M galvanized steel sheet, minimum G60 coating; minimum yield strength of 55,000 psi (380 MPa) for 22, 20, 18 and 16 GA components or 50,000 psi (345 MPa) for 14 GA and 12 GA components; minimum tensile strength of 65,000 psi (448 MPa) for 22, 20, 18, 16, 14, and 12 GA components.
 - a. Nominal 28 mil (22 GA) members:
 - 1) Minimum bare metal thickness: 0.0284 inch (0.72 mm).
 - 2) Maximum design thickness: 0.0299 inch (0.76 mm).
 - b. Nominal 33 mil (20 GA) members:
 - 1) Minimum bare metal thickness: 0.0329 inch (0.84 mm).
 - 2) Maximum design thickness: 0.0346 inch (0.88 mm).
 - c. Nominal 43 mil (18 GA) members:
 - 1) Minimum bare metal thickness: 0.0428 inch (1.09 mm).
 - 2) Maximum design thickness: 0.0451 inch (1.15 mm).
 - d. Nominal 54 mil (16 GA) members:
 - 1) Minimum bare metal thickness: 0.0538 inch (1.37 mm).
 - 2) Maximum design thickness: 0.0566 inch (1.44 mm).
 - e. Nominal 68 mil (14 GA) members:
 - 1) Minimum bare metal thickness: 0.0677 inch (1.72 mm).
 - 2) Maximum design thickness: 0.0713 inch (1.81 mm).
 - f. Nominal 97 mil (12 GA) members:
 - 1) Minimum bare metal thickness: 0.0966 inch (2.46 mm).
 - 2) Maximum design thickness: 0.1017 inch (2.58 mm).

3. Tube Webs: Cold-formed ASTM A500 steel structural tubing; minimum yield strength of 45,000 psi (310 MPa); minimum tensile strength of 55,000 psi (380 MPa).
 - a. Nominal 33 mil (20 GA) members:
 - 1) Minimum bare metal thickness: 0.033 inch (0.84 mm).
 - 2) Maximum design thickness: 0.035 inch (0.89 mm).
 - b. Nominal 47 mil (18 GA) members:
 - 1) Minimum bare metal thickness: 0.047 inch (1.19 mm).
 - 2) Maximum design thickness: 0.049 inch (1.24 mm).
 - c. Nominal 63 mil (16 GA) members:
 - 1) Minimum bare metal thickness: 0.063 inch (1.6 mm).
 - 2) Maximum design thickness: 0.065 inch (1.65 mm).
 4. Rolled formed Webs: Cold-formed from ASTM A 653/A 653M galvanized steel sheet, minimum G60 coating; minimum yield strength of 40,000 psi (276 MPa) for 20 and 18 GA components or 50,000 psi (345 MPa) for 16 GA components; minimum tensile strength of 55,000 psi (379 MPa) for 20 and 18 GA components or 65,000 psi (448 MPa) for 16 GA components.
 - a. Nominal 33 mil (20 GA) members:
 - 1) Minimum bare metal thickness: 0.0329 inch (0.84 mm).
 - 2) Maximum design thickness: 0.0346 inch (0.88 mm).
 - b. Nominal 43 mil (18 GA) members:
 - 1) Minimum bare metal thickness: 0.0428 inch (1.09 mm).
 - 2) Maximum design thickness: 0.0451 inch (1.15 mm).
 - c. Nominal 54 mil (16 GA) members:
 - 1) Minimum bare metal thickness: 0.0538 inch (1.37 mm).
 - 2) Maximum design thickness: 0.0566 inch (1.44 mm).
- C. Fasteners Used in Fabricating Trusses: Fasteners as recommended by Truss Component Manufacturer, bearing stamp of Truss Component Manufacturer for ready identification.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that bearing surfaces and substrates are ready to receive steel trusses.
- B. Verify that truss bearing surfaces are within the following tolerances:
 1. Variation from Level or Specified Plane: Maximum 1/8 inch in 10 feet (6 mm in 3 m).
 2. Variation from Specified Position: Maximum 1/4 inch (6 mm).
- C. Verify that rough-in utilities and chases that will penetrate plane of trusses are in correct locations and do not interfere with truss, bracing, or bridging placement.
- D. Inspect conditions under which installation is to be performed and submit written notification if such conditions are unacceptable to installer.
 1. Notify Architect/Building Designer within 24 hours of inspection.

2. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
3. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 INSTALLATION

- A. Install trusses in accordance with Truss Component Manufacturer's instructions and Truss Manufacturer's Engineered Truss Design Drawings, Truss Placement Diagram and Engineered Connection Drawings. Use correct fasteners as previously described.
- B. Install all erection (temporary installation) bracing and permanent bracing and bridging before application of any loads; follow recommendations of the CFSBCSI - Cold-Formed Steel Building Components Safety Information.
- C. Install erection bracing - follow recommendations of the CFSBCSI - Cold-Formed Steel Building Components Safety Information.
 1. Provide bracing that holds trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened to form a structurally sound framing system.
 2. All sub-contractors shall employ proper construction procedures to insure adequate distribution of temporary construction loads so that the carrying capacity of any single truss or group of trusses is not exceeded.
- D. Install permanent bracing and bridging as shown in the Architect/Building Designer's drawings and notes and in the locations shown shown on the Truss Manufacturers Engineered Permanent Bracing Drawings.
- E. Removal, cutting, or alteration of any truss chord, web or bracing member in the field is prohibited, unless approved in advance in writing by the Architect/Building Designer and the Truss Design Engineer.
- F. Repair or replace damaged chords, webs, and complete trusses as directed and approved in writing in advance by the Architect/Building Designer and the Truss Component Manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Owner will provide inspection service to inspect field connections; see Section 01 40 00.

END OF SECTION 054400