

SECTION 05 44 00

PRE-ENGINEERED and 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. Structural Component Manufacturer: The maker of the components that will be assembled into trusses by the Truss Manufacturer. See MANUFACTURERS for acceptable Structural Component Manufacturer.
- B. Truss Manufacturer: An individual or organization engaged in the manufacturing of shop fabricated trusses. 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.
- E. Truss Placement Diagram: Illustration identifying the assumed location of each truss.

1.4 REFERENCES

- A. ANSI/AISI/S100-16 (2020) w/S2-20, North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2016 edition (Reaffirmed for 2020) with Supplement 2.
- B. ANSI/AISI/S240-20, North American Standard for Cold-Formed Steel Structural Framing; 2020 edition.
- C. ANSI/AISI/S202-20, Code of Standard Practice for Cold-Formed Steel Structural Framing; 2020 edition.
- D. ASTM A500-23, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- E. ASTM A653-23, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- F. ASTM A780-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings; 2020.

- G. CFSBCSI, Cold-Formed Steel Building Components Safety Information; Cold-Formed Steel Council (CFSC); 2019.
- H. 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.
- B. Product Data: Structural Component Manufacturer's descriptive literature for each item of cold-formed metal framing and each accessory specified in this section.
- C. Truss Design Drawings: Detailed drawings prepared by Truss Manufacturer under the supervision of the Truss Design Engineer 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.
- E. Installation Guidelines: Structural Component Manufacturer's printed guidelines for handling, storage, and installation of each item of cold-formed metal framing and each accessory specified in this section.

1.6 QUALITY ASSURANCE

- A. Provide design of trusses by Structural Component Manufacturer, using design methodologies recommended in AISI references.
 - 1. Provide Truss Manufacturer's Truss Design Drawings.
 - 2. Truss Design Drawings shall be prepared by a Registered Design Professional licensed in the State in which project is to be constructed.
 - 3. Registered Design Professional shall provide proof of professional liability insurance.
 - 4. Truss Members: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- B. Pre-Installation Meeting: If applicable, coordinate prior to scheduled 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 fire sprinkler systems.
 - 4. 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 fabricated trusses in accordance with CFSBCSI recommendations and in manner necessary to prevent damage or distortion.
- B. Store and protect shop fabricated trusses in accordance with CFSBCSI recommendations and in manner necessary to prevent damage, distortion and moisture buildup.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Structural Component Manufacturer: TrusSteel Products from Alpine TrusSteel, An ITW Company; 6750 Forum Dr, Ste 305, Orlando, FL 32821. Tel: (888) 565-9181. www.TrusSteel.com.
- B. Acceptable Truss Manufacturers: Structural Components shall be fabricated into completed trusses by one of the following fabricators: <https://trussteel.com/find-fabricator/>
 - 1. _____.
 - 2. _____.
 - 3. _____.
- C. Field fabrication of trusses is strictly prohibited.
- D. Acceptable Truss Manufacturers: Truss components shall be fabricated into completed trusses by fabricators that have at least 5 years worth of experience in the design and supply of Cold-Formed Steel Trusses.
- E. Substitutions: Not permitted.

2.2 COMPONENTS

- A. Pre-Engineered, Pre-Fabricated Cold-Formed Steel Trusses: TrusSteel truss components by Alpine 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.
 - 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 Structural Component Manufacturer's screws only for easy identification 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/S240-20 Section E5.3.

- B. Truss Chord and Web Structural Components: All truss structural components to be symmetrical in profile and loading orientation, with rolled or closed edges to minimize the danger of cutting during handling; chord and web structural 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 55,000 psi (380 MPa) yield strength for 22, 20, 18, and 16 GA structural components; minimum 50,000 psi (345 MPa) yield strength for 14 and 12 GA structural components.
 - a. Material thickness:
 1. 28 mil (22 GA) – Minimum bare metal thickness: 0.0284 inch (0.72 mm).
 2. 33 mil (20 GA) – Minimum bare metal thickness: 0.0329 inch (0.84 mm).
 3. 43 mil (18 GA) – Minimum bare metal thickness: 0.0428 inch (1.09 mm).
 4. 54 mil (16 GA) – Minimum bare metal thickness: 0.0538 inch (1.37 mm).
 5. 68 mil (14 GA) – Minimum bare metal thickness: 0.0677 inch (1.72 mm).
 6. 97 mil (12 GA) – Minimum bare metal thickness: 0.0966 inch (2.46 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. Material thickness:
 1. 33 mil (20 GA) – Minimum bare metal thickness: 0.035 inch (0.89 mm).
 2. 47 mil (18 GA) – Minimum bare metal thickness: 0.047 inch (1.19 mm).
 3. 63 mil (16 GA) – Minimum bare metal thickness: 0.063 inch (1.6 mm).
 4. Rolled formed Webs: Cold-formed from ASTM A 653/A 653M galvanized steel sheet, minimum G60 coating; minimum 40,000 psi (276 MPa) yield strength for 20 and 18 GA structural components; minimum 50,000 psi (345 MPa) yield strength for 16 GA structural components.
 - a. Material thickness:
 1. 33 mil (20 GA) – Minimum bare metal thickness: 0.0329 inch (0.84 mm).
 2. 43 mil (18 GA) – Minimum bare metal thickness: 0.0428 inch (1.09 mm).
 3. 54 mil (16 GA) – Minimum bare metal thickness: 0.0538 inch (1.37 mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. The installer shall examine areas and conditions under which the truss framing is to be installed. Work shall not proceed until unsatisfactory conditions have been corrected by those responsible.
- B. The contractor shall coordinate installation drawings, resolution of dimensional problems, compatibility of various trades and installation.

3.2 INSTALLATION

- A. Install trusses in accordance with Structural Component Manufacturer's guidelines and Truss Manufacturer's Truss Design Drawings and Truss Placement Diagram. Use correct fasteners as previously described.
- B. Place trusses at spacings indicated on the Truss Design Drawings.
- C. 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.
 - 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 developed in accordance with ANSI/AISI/S202-20 Section I1.6 and in the locations shown on the Truss Manufacturer's Truss Design 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 Structural Component Manufacturer.

3.3 FIELD QUALITY CONTROL

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

3.4 REPAIRS AND PROTECTION

- A. Galvanizing repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel trusses with galvanized repair paint according to ASTM A 780 and Structural Component Manufacturer's written guidelines.
- B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer and installer, that ensure the cold-formed steel trusses are without damage or deterioration at the time of substantial completion.

END OF SECTION

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