

SECTION 05410 - PRE-ENGINEERED, PRE-FABRICATED
LIGHT GAUGE STEEL ROOF TRUSSES

PART I - GENERAL

1.01 SUMMARY

- A. Section includes pre-engineered, prefabricated light gauge cold formed steel roof trusses, anchorage, bracing and bridging.
- B. Related work specified in other sections
 - 1. Drywall attachment
 - 2. Roofing, fascia, soffits

1.02 REFERENCES

- A. Reference standards:
 - 1. ASTM A653/A653M-94 "Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process."
 - 2. ASTM A780-93A "Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
 - 3. AWS D1.1 "Structural Welding Code - Structural Steel"
 - 4. AWS D1.3 "Structural Welding Code - Sheet Steel."

1.03 PERFORMANCE REQUIREMENTS

- A. AISI Specifications:
Calculate structural characteristics of cold formed steel truss members according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members, 1986 (1990)."
- B. Structural Performance:
Design, Engineer, Fabricate, and Erect coldformed steel trusses to withstand specified design loads within limits and under conditions required.
 - 1. Design Loads: As specified on Contract Documents.
 - 2. Deflections: Live load deflection meeting the following (unless otherwise specified):
 - a. Roof Trusses: Vertical deflection less than or equal to $L/240$ of the span.
 - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 deg F (67 deg C).

1.04 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each type of cold-formed steel framing and accessory required.
- B. Submit detailed roof truss layout drawings showing truss type (mark no.), location, spacing, method of attachment to supporting members and all necessary erection and connection details. Indicate supplemental bracing, strapping, splices, bridging, accessories and details required for proper installation. Truss layout drawings shall be sealed and signed by a qualified Professional Engineer registered to practice in the State of Maine.
- C. Submit truss detail drawings and calculations indicating conformance of design with local building code requirements. Detail drawings and calculations shall be sealed and signed by a qualified Professional Engineer, registered to practice in the State of Maine. Submittal shall include:
 - 1. Description of design criteria including gravity and wind forces per BOCA 1999.
 - 2. Engineering analysis depicting member stresses and truss deflection.
 - 3. Truss member sizes, gages and connection details at truss joints.
 - 4. Truss support reactions and anchorage required.
 - 5. Top chord, Bottom chord and Web bracing requirements.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Fabrication shall be performed by a coldformed steel truss fabricator with experience designing and fabricating cold-formed steel truss systems equal in material, design, and extent to the systems required for this Project.
 - 1. Cold Formed steel truss system installation shall be performed by an experienced installer approved by the steel truss system fabricator.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 -"Structural Welding Code--Sheet Steel"
 - 1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's unopened containers or bundles, fully identified by name, brand, type, grade or piece mark. Exercise care to avoid damage during unloading, storing and erection.
- B. Store trusses on blocking, pallets., platforms or other supports off the ground and in an upright position sufficiently braced to avoid damage from excessive bending.

- C. Protect trusses and accessories from corrosion, deformation, damage and deterioration when stored at job site. Keep trusses free of dirt and other foreign matter.

1.07 PROJECT CONDITIONS

- A. During construction, adequately distribute all loads applied to trusses so as not to exceed the carrying capacity of any one joist, truss or other component.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: Ultra-Span® Truss Manufacturer or pre-approved equivalent.

2.02 COMPONENTS

- A. Provide manufacturer's standard steel truss members, bracing, bridging, blocking, reinforcements, fasteners and accessories with each type of steel framing required, as recommended by the manufacturer for the applications indicated and as needed to provide a complete light gauge cold formed steel truss system.

2.03 MATERIALS

- A. Materials:
 - 1. Fabricate components of structural quality steel sheet per ASTM A653 with a minimum yield strength of 40,000 psi.
 - 2. Fabricate bracing, bridging and blocking member components of commercial quality steel sheet per ASTM A653 with a minimum yield strength of 33,000 psi.
- B. Steel truss components shall be provide in the gages indicated.
 - 1. Design Uncoated-Steel Thickness: 20 ga., 0.0350 inch (0.91 mm).
 - 2. Design Uncoated-Steel Thickness: 18 ga., 0.0460 inch (1.20 mm).
 - 3. Design Uncoated-Steel Thickness: 16 ga., 0.0570 inch (1.52 mm).
 - 4. Design Uncoated-Steel Thickness: 14 ga., 0.0730 inch (1.90 mm).
- C. Finish: Provide components with protective zinc coating complying with ASTM A653, minimum G60 coating.

- D. Fastenings:
 - 1. Manufacturer recommended self-drilling, self-tapping screws with corrosion-resistant plated finish. Fasteners shall be of sufficient size and number to ensure the strength of the connection.
 - 2. Welding: Comply with AWS D1.1 when applicable and AWS D1.3 for welding base metals less than 18 gage thickness.
 - 3. Other fasteners as accepted by truss engineer.

2.04 FABRICATION

- A. Factory to fabricate coldformed steel trusses plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.
 - 1. Fabricate truss assemblies in jig templates.
 - 2. Cut truss members by sawing or shearing or plasma cutting.
 - 3. Fasten cold-formed steel truss members by welding or screw fastening, or other methods as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to coldformed steel truss component manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- B. Care shall be taken during handling, delivery and erection. Brace, block, or reinforce truss as necessary to minimize member and connection stresses.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine structure, substrates and installation conditions. Do not proceed with coldformed steel truss installation until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION - GENERAL

- A. General:
 - 1. Erection of trusses, including proper handling, safety precautions, temporary bracing and other safeguards or procedures are the responsibility of the Contractor and Contractor's installer.

2. Exercise care and provide erection bracing required to prevent toppling of trusses during erection.
- B. Install, bridge, and brace trusses according to manufacturer's recommendations and requirements of industry literature.
- C. Space trusses as follows: Standard Truss spacing: 24 inches (610 mm). Provide closer spacing if required by truss design stresses or connection requirements.
- D. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at design spacing indicated.
- E. Provide proper lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by truss fabricator. Exercise care to avoid damage to truss members during erection and to keep horizontal bending of the trusses to a minimum.
- F. Provide framing anchors as indicated or accepted on the engineering design drawing or erection drawings. Anchor trusses securely at bearing points.
- G. Install roof framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations.
 1. DO NOT cut truss members without prior approval of truss engineer.
 2. Fasten cold-formed steel roof framing by welding or screw fastening, as standard with fabricator. Wire tying of roof framing is not permitted.
 - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to cold-formed roof framing Manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
 - c. Install roof framing in one-piece lengths, unless splice connections are indicated.
 - d. Provide temporary bracing and leave in place until trusses are permanently stabilized.
- H. Erection Tolerances: Install trusses to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
 1. Space individual trusses no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements

- I. Do not alter, cut, or remove truss members or connections of truss members.
- J. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacing indicated.
- K. Erect trusses without damaging truss members or connections.
- L. Align truss bottom chords with load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.
- M. Install continuous bridging and permanent truss bracing per truss design requirements.
- N. Install necessary roof cross and diagonal bracing per design professional's recommendations.

3.05 REPAIRS AND PROTECTION

Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanizing repair paint according to ASTM A780 and the manufacturer's instructions.

END OF SECTION