

SECTION: 05 44 13

COLD-FORMED METAL ROOF TRUSSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes pre-engineered, pre-fabricated cold-formed steel framing elements.

Work includes:

- 1) Cold-formed steel roof trusses.
- 2) Anchorage, bracing and bridging.

- B. Related Sections

- 1) Section 03 00 00 – Concrete
- 2) Section 04 20 00 – Unit Masonry
- 3) Section 05 10 00 – Structural Metal Framing
- 4) Section 05 30 00 – Metal Decking
- 5) Section 05 40 00 – Cold-Formed Steel Framing
- 6) Section 05 41 00 – Structural Metal Stud Framing
- 7) Section 05 42 23 – Cold-Formed Metal Roof Joists
- 8) Section 07 30 00 – Steep Slope Roofing
- 9) Section 07 40 00 – Roofing And Siding Panels
- 10) Section 07 60 00 – Flashing And Sheet Metal
- 11) Section 07 70 00 – Roof And Wall Specialties and Accessories
- 12) Section 08 60 00 – Roof Windows and Skylights
- 13) Section 08 90 00 – Louvers And Vents

1.2 REFERENCES

- A. Reference standards:

- 1) ASTM:
 - a) ASTM A653/A653M-94 "Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Glavanealed) by the Hot Dip Process."
 - b) ASTM A780-93a "Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
- 2) American Welding Society (AWS)
 - a) AWS D1.1 "Structural Welding Code - Steel."
 - b) AWS D1.3 "Structural Welding Code - Sheet Steel."
- 3) Light Gauge Steel Engineers Association Field Installation Guide
- 4) American Iron and Steel Institute (AISI)
 - a) D100-13 – Cold-Formed Steel Design Manual, 2013 Edition
 - b) AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members, 2012 Edition
 - c) AISI-S200-12 – North American Standard for Cold-Formed Steel Framing – General Provisions.
 - d) AISI-S201-12 – North American Standard for Cold-Formed Steel Framing – Product Data.
 - b) AISI-S214-12 – North American Standard for Cold-Formed Steel Framing – Truss Design.
- 5) ASCE 7-16 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

1.3 PERFORMANCE REQUIREMENTS

- A. AISI "Specifications": Calculate structural characteristics of cold-formed steel truss members according to American Iron and Steel Institute "North American Specification for the Design of Cold-Formed Steel Structural Members, 2012"
- B. Structural Performance: Design, fabricate, and erect cold-formed steel trusses to withstand

specified design loads within limits and under conditions required.

- C. Design Loads: As specified.
- D. Deflections meeting the following (unless otherwise specified):
 - 1) Live Load: Vertical deflection less than or equal to Length/360.
 - 2) Total Load: Vertical deflection less than or equal to Length/240.
- E. Design framing systems to provide for movement of framing members without damage or over-stressing, 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).

1.4 SUBMITTALS

- A. Submit all documentation in accordance with Section 01 30 00.
- B. Submit manufacturer's product data and installation instructions for each type of cold-formed steel framing and accessory required.
- C. Submit detailed roof truss layout indicating placement of trusses.
- D. Submit individual truss drawings, sealed and signed by a qualified registered Professional Engineer, verifying accordance with local building code and design requirements.
Include:
 - 1) Description of design criteria.
 - 2) Engineering analysis depicting member stresses and truss deflection.
 - 3) Truss member sizes and thickness and connections at truss joints.
 - 4) Truss support reactions.
 - 5) Top chord, Bottom chord and Web bracing requirements.
- E. Submit final roof plan drawings sealed and signed by a qualified registered Professional Engineer depicting final installed truss assembly.
Include:
 - 1) All truss to truss connections
 - 2) All truss to structure (bearing) connections
- F. Plan and details for the location of all permanent lateral and diagonal bracing and/or blocking required in the top chord, web, and bottom chord planes. (Diaphragms excluded)

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Fabrication shall be performed in a quality controlled manufacturing environment by a cold-formed steel truss fabricator with experience fabricating Cold-Formed Steel trusses equal in material, design, and scope to the trusses required for this Project.
- B. Installation of Cold-Formed Steel truss roof assembly shall be performed by an installer with experience installing Cold-Formed Steel trusses equal in material, design and scope to the trusses required for this Project.
- C. Welding Standards
 - 1) Comply with applicable provisions of AWS D1.1 "Structural Welding Code - Steel" and AWS D1.3 "Structural Welding Code - Sheet Steel."
 - 2) Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's unopened containers or bundles, fully identified by name, brand, type and grade. 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.

1.7 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

VanderWal Homes & Commercial Group Inc.

4427 VanderWal Drive

Petrolia, ON N0N 1R0

P. 1-877-251-6875

F. 1-866-873-0360

E. info@trusses.ca

Website: <http://www.trusses.ca>

Service Area

- Alberta · British Columbia · Manitoba · New Brunswick · Newfoundland ·
- Northwest Territories · Nova Scotia · Nunavut Territory · Ontario ·
- Prince Edward Island · Quebec · Saskatchewan · Yukon Territory ·

Products

- Cold-Formed Steel Trusses · Cold-Formed Steel Wall Panels · Cold-Formed Steel Floors Systems ·

2.2 COMPONENTS

- A. System components: Aegis Metal Framing, LLC ULTRA-SPAN® and POSI-STRUT® cold-formed steel roof truss and floor truss components.
- B. 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 cold-formed steel truss roof assembly.

2.3 MATERIALS

- A. Materials:
 - 1) For all chord and web members: Fabricate components of structural quality steel sheet per ASTM A653/A653M-15e1 with a minimum yield strength of 50,000 psi.
 - 2) Bracing, bridging and blocking members: Fabricate components of commercial quality steel sheet per ASTM A653/A653M-15e1 with a minimum yield strength of 33,000 psi.
- B. Ultra-Span steel truss components: Provide sizes, shapes and gauges indicated.
 - 1) Design Uncoated-Steel Thickness: 0.0350 inch (0.89 mm) (nominal 20 ga)
 - 2) Design Uncoated-Steel Thickness: 0.0460 inch (1.17 mm) (nominal 18 ga)

- 3) Design Uncoated-Steel Thickness: 0.0570 inch (1.45 mm) (nominal 16 ga)
 - 4) Design Uncoated-Steel Thickness: 0.0730 inch (1.85 mm) (nominal 14 ga)
 - 5) Design Uncoated-Steel Thickness: 0.0970 inch (2.46 mm) (nominal 12 ga)
- C. Finish: Provide components with protective zinc coating complying with ASTM A653/A653M-15e1, minimum G60 coating.
- D. Fastenings:
- 1) Manufacturer recommended self-drilling 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 1/8" thick.
 - 3) Other fasteners as accepted by truss engineer.

2.4 FABRICATION

- A. Factory fabricate cold-formed 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 screw fastening, or other methods as standard with fabricator.
 - 4) Locate mechanical fasteners and install according to cold-formed 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. Refer to LGSEA "Field Installation Guide".
- C. Fabrication Tolerances: Fabricate 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) Spacing: Space individual trusses no more than plus or minus 1/8 inch (3mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2) Squareness: Fabricate each cold-formed steel truss to a maximum out-of-square tolerance of 1/8 inch (3mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine structure, substrates and installation conditions. Do not proceed with cold-formed steel truss installation until unsatisfactory conditions have been corrected.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION, GENERAL

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

- installer. Refer to LGSEA "Field Installation Guide".
- 2) Exercise care and provide installation bracing required to prevent toppling of trusses during erection.
- B. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at design spacing indicated.
 - C. Provide proper lifting equipment, including spreader bar, 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.
 - D. Provide framing anchors as indicated or accepted on the engineering design drawing or erection drawings. Anchor trusses securely at bearing points.
 - E. Install trusses plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations.
 - F. DO NOT cut truss members without prior approval of truss engineer.
 - G. Fasten cold-formed steel trusses by screw fastening, welding or other methods, as standard with fabricator.
 - 1) Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 2) Locate mechanical fasteners and install according to cold-formed truss manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
 - H. Install trusses in one-piece lengths, unless splice connections are indicated.
 - I. Provide installation bracing and leave in place until trusses are permanently stabilized.
 - J. 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 of sheathing or other finishing materials.
 - 2) Limit out-of-plane bow and plumb per LGSEA "Field Installation Guide".

3.3 ROOF TRUSS INSTALLATION

- A. Install trusses per installation documents provided for in Section 1.4.
- B. Space trusses per sealed truss drawings.
- C. Do not alter, cut, or remove truss members or connections of truss members.
- D. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacing indicated.
- E. Erect trusses without damaging truss members or connections.
- F. Anchor trusses securely at all points of support, per installation documents provided for in Section 1.4.
- G. Install all continuous bridging and permanent truss bracing per installation documents provided for in Section 1.4.
- H. Perform all truss-to-truss connections per installation documents provided for in Section 1.4.

3.4 REPAIRS AND PROTECTION

- A. Truss Repairs: Contact truss manufacturer and request repair details for any damage to the trusses. Damage to individual truss members or truss sections resulting from the improper shipping, handling or storage of the trusses must be repaired prior to truss installation.
- B. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanizing repair paint according to ASTM A780/A780M-09 and the manufacturer's instructions.

END OF SECTION