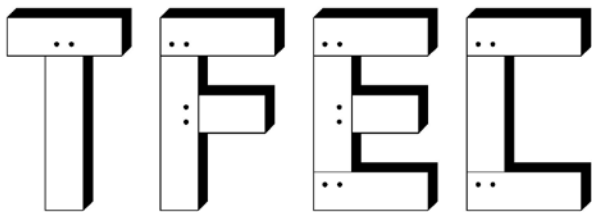


TFEC 2-2013

Code of Standard Practice for Timber Frame Structures

August 2013



• TIMBER FRAME •
ENGINEERING COUNCIL

Preface

This Code is intended to represent a reasonable consensus of what constitutes ordinary and acceptable practice within the timber frame industry. Unless specific provisions to the contrary are contained in the contract documents, the practices that are contained herein are considered to be the standard custom for the design, engineering and construction of timber frame structures. Contract documents include construction drawings, specifications and construction contracts or agreements.

This Code of Standard Practice is intended to apply to timber frame structures that are fabricated and erected by qualified timber frame contractors and engineered by qualified design professionals.

This Code is not intended to define a professional standard of care or to alter any roles and responsibilities established in the contract documents.

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SECTION 1. GENERAL PROVISIONS

1.01 Related Documents

Applicable portions of the following standards are hereby made a part of this document in their entirety as though fully set forth herein:

ASTM International (ASTM) D xxxx, Standard Specification and Guidelines for Establishing Design Properties of Round Wood Dowels (Pegs) for Use in Wood Construction. (pending)

American Wood Council (AWC) National Design Specification for Wood Construction (NDS).

Canadian Standards Association (CSA) 086-09 Engineering Design in Wood.

Council of American Structural Engineers (CASE) National Practice Guidelines for Specialty Structural Engineers.

TFEC 1-2010 Standard for Design of Timber Frame Structures and Commentary.

1.02 Responsibility for Design

When the owner engages an Architect and/or Structural Engineer of Record (SER) to design the project, the Timber Frame Contractor (TFC) shall not be responsible for the suitability, adequacy or Building Code conformance of the design.

When the Architect and/or SER delegate design responsibility to the TFC for engineering portions of the timber frame structure, such as connection joinery, the TFC shall engage a Specialty Structural Engineer (SSE) to perform the required timber engineering services based on load criteria specified by the SER. If no loading criteria have been specified, the SSE shall establish the loading criteria based on the requirements of the applicable Building Code.

When the owner or contractor enters into a direct contract with the TFC to both design and construct a complete timber frame structure, the TFC shall engage a Specialty Structural Engineer (SSE) and shall be responsible for the adequacy of the timber frame design. The owner or contractor shall be responsible for the suitability, adequacy and Building Code conformance of the non-timber frame elements.

When the timber frame is not the exclusive Main Force Resisting System (MFRS), but acting in conjunction with Structural Insulated Panels (SIPs) or another structural system to resist lateral and/or gravity loads, the TFC shall coordinate the timber frame design with the SSE responsible for engineering the complementing structural system.

SECTION 2. MATERIALS

2.01 Timber Grading

All structural timbers shall be graded by an approved lumber grading agency or other qualified individual. Timbers shall bear a grade stamp or other certification from the lumber grader.

When such grading is performed by an individual that is not certified as a grader by a lumber grading or approved inspection agency, the assigned timber grade shall not be higher than #2 unless approved by the structural engineer or local Building Official.

2.02 Natural Timber Growth Characteristics

Knots, checks and other natural timber features shall not be construed as defects unless their magnitude exceeds the limits prescribed in the applicable lumber grading rules.

2.03 Volume Change

Timber materials naturally experience dimensional changes with variations in moisture content. Unless seasoned or dried timbers have been specified, timber materials may be unseasoned or green. Timber dimensions and tolerances shall be measured at the time of installation. Final timber dimensions and tolerances may deviate from specified values after timbers have seasoned due to drying shrinkage.

If timber erection is delayed excessively, some remedial work may be required due to volume change movements of joinery after fabrication to ensure that joints fit tightly. Any associated additional cost shall be the responsibility of the party responsible for the delay.

SECTION 3. SUBMITTALS

3.01 Shop Drawings

The TFC shall prepare detailed shop drawings of the timber frame including timber sizes, dimensions, grades, edge treatment, surface treatment, finishes and connection joinery details.

The shop drawings shall be prepared under the supervision and direction of the SSE. When required by the contract documents, the SSE shall sign and seal the shop drawings prior to submitting for approval.

The Architect and/or SER shall review the shop drawings for general compliance with the contract documents. The review shall be performed in a timely manner so as not to delay the timber frame construction.

3.02 Samples

The TFC shall submit samples and mock-ups of timber materials including surface treatments and finishes when required by the contract documents.

SECTION 4. TIMBER FABRICATION

4.01 Approved Shop Drawings

Timbers shall be fabricated in strict conformance to approved shop drawings. Fabrication prior to receipt of approved shop drawings shall be at the TFC's risk.

4.02 Connection Joinery

Timber joints shall be fabricated to produce tight fitting joints after assembly. Provisions shall be made in the joinery to allow for dimensional changes associated with timber drying shrinkage.

Pegged joints may be draw bored. The maximum diameter of draw bored pegs shall be 1 inch. Peg holes shall have sufficient end distance to prevent splitting of tenons during driving of pegs.

4.03 Quality Control

The TFC shall be responsible for maintaining quality control procedures during timber fabrication.

SECTION 5. TIMBER ERECTION

5.01 Job-Site Conditions

The TFC shall be responsible for examining the job site prior to timber erection to verify that the access, material staging areas and site conditions are suitable for the operation of erection equipment such as cranes and lifts.

The TFC shall be responsible for measuring the foundations and any structural framing that supports the timber framing. The TFC shall report to the General Contractor or Construction Manager any unacceptable conditions. The TFC shall not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner unless directed in writing to proceed by the General Contractor or Construction Manager who shall assume responsibility for any additional costs associated with accommodating the unsatisfactory conditions. Commencement of erection implies acceptance of conditions.

5.02 Shoring and Bracing

The TFC shall be responsible for all temporary shoring and bracing necessary to maintain the stability of the timber frame during erection of the timber frame.

When lateral loads are resisted by a building system other than the timber frame such as SIP or wood frame shear walls, temporary bracing shall remain in place until the MFRS for lateral loads is in place.

5.03 Handling and Storage

The TFC shall provide reasonable protection during transportation, storage, handling and erection of the timbers to avoid marring, staining, or the accumulation of excess moisture, dirt and foreign matter.

Timbers shall be stored off of the ground and protected prior to erection.

5.04 Final Cleaning Up

Upon the completion of timber erection and before final acceptance, the TFC shall remove all rubbish and clean any soiled timbers.

SECTION 6. TOLERANCES

6.01 General

Fabrication tolerances shall be measured at the time of fabrication and erection tolerances shall be measured at the time of timber frame installation.

If a tolerance is not specified herein, it shall not be assumed that the tolerance is zero.

Tolerances for raw material, such as timber dimensions, warp, etc., are specified in the applicable timber grading rules.

Timbers shall be oriented so that crown, if any, is up.

When antique timbers or timbers finished with a heavy surface texture such as rough hewn timbers are used, some of the stated tolerances may not be applicable.

6.02 Fabrication Tolerances

Timber length, shoulder to shoulder:	+/- 1/8"
Mortise length:	-0" to + 1/16"
Mortise depth:	-0" to + 1"
Mortise width:	-0" to +1/16"
Tenon height:	-1/8" to +1/32"
Tenon length:	-1/8" to +0"
Tenon width:	-1/8" to +1/32"
Angle cuts:	+/- 1 degree
Peg hole location:	+/- 1/4"
Peg hole diameter:	+/- 1/64"

6.03 Erection Tolerances

Plumb: vertical timbers such as posts shall be not more than $\frac{1}{4}$ inch out of plumb in 6 feet and not more than $\frac{1}{2}$ inch out of plumb in their full height. Measurements for plumb shall be made at the reference face(s) or centerline as appropriate to the layout system used. Inclined timbers shall be measured with reference to the specified building lines.

Level: individual horizontal timbers such as floor beams or girders shall not be out of level measured from one end to the other more than $\frac{3}{8}$ inch. Ordinary deflection or camber shall not be measured as out of level. Accumulated tolerances shall not result in the structure being out of level more than $\frac{3}{4}$ inch.

Plan location: variations in plan location of any post or beam with respect to reference face(s) or centerline as appropriate to the layout system used shall not be more than $\frac{1}{4}$ inch.

Alignment (flatness): variations of reference surface elevation from the specified elevation at any location shall not exceed $\frac{3}{8}$ inch. Variations in alignment of referenced surfaces of adjacent joists, beams, rafters, purlins, posts and truss top chords shall not exceed $\frac{1}{8}$ inch per foot of spacing nor $\frac{3}{8}$ inch. Alignment shall be measured at ends of timbers so as not to be influenced by differential deflection or camber.