

SECTION 06130: TIMBER FRAMING MASTER SPECIFICATION (VERSION ~~85/2431~~/2011)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

1.2 WORK INCLUDED

***[Note to Specifier: Clarify whether timber frame Contractor is responsible for design of gravity load support and lateral stability of timber frame structure and whether other rough carpentry, SIPs, etc., are to be provided and installed as part of work of this section.]***

- A. Work includes furnishing labor, materials, and equipment to design, furnish, and install structural and architectural timber framing as detailed in drawings or specified, including structural design of timber frame system, joinery, and connections not provided in drawings, and supplying associated fasteners to complete system and connect timber framing members to structural supports.
- B. Types of timber construction specified in this section include the following:
1. Beams, girders, [plates, sills, girts, and purlins](#) ~~and~~ [and joists](#).
  2. Columns and posts, [braces and bolsters](#).
  3. Timber trusses.
  4. Solid wood decking.

1.3 RELATED WORK

- A. The following sections are related to work of this section:

***[Note to Specifier: Delete sections not applicable to project.]***

1. Section 06100 Rough Carpentry.
2. Section 06071 Pressure-Treated Wood Products.
3. Section 06180 Glue-Laminated Timbers.
4. Section 06200 Finish Carpentry.

- B. The following sections specify products to be installed as part of work of this section:

1. Section 06120 Structural Insulated Panels.

1.4 DEFINITIONS

***[Note to Specifier: Eliminate inspection agencies indicated below not applicable to project.]***

A. Inspection Agencies and abbreviations used to reference them include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NHLA - National Hardwood Lumber Association.
3. NLGA - National Lumber Grades Authority.
4. SPIB - Southern Pine Inspection Bureau.
5. WCLIB - West Coast Lumber Inspection Bureau.
6. WWPA - Western Wood Products Association.
7. AWWPA – American Wood Protection Association

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Schedule timber delivery and installation to avoid extended on-site storage.
- B. Keep timber members dry during delivery and storage. Cover timber with weathertight tarps. Do not store members in areas of high or low relative humidity.
- C. Cut and stack timber so as not to encourage growth of sap-stain fungi, mold, carpenter ants, borers, etc.
- D. Stack timbers with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

#### 1.6 SUBMITTALS

A. Shop Drawings: Submit for review shop drawings signed and sealed by a Structural Engineer registered in state where project is located. Show design loads, material properties, full dimensions of each member, and layout of timber frame system. Show large-scale details of joints and connections. Provide hardware cut sheets and design values for fasteners.

B. Samples: Full width and depth, 24 inches long, showing range of variation expected in appearance, including surface texture and finish of wood products.

~~B.C.~~ Provide manufacturer's certification of moisture content.

*[Note to Specifier: Specify whether certification of timber grading is to be submitted and whether certification of moisture content at time of fabrication or delivery is to be submitted.]*

#### 1.7 QUALITY ASSURANCE

*[Note to Specifier: Edit or delete paragraph below as required by project.]*

- A. Fabricator and Erector of timber framing shall not have less than [##] years experience in fabrication and erection of timber framing.
- B. Timbers shall be graded by lumber grading agency certified by American Lumber Standards Committee.

- C. Locate grade stamp on timber surfaces not exposed to view in completed work. Grade certification can be submitted in lieu of grade stamping material.

## PART 2 - PRODUCTS

### 2.1 GENERAL

*[Note to Specifier: Edit or delete paragraphs below as required by project.]*

- A. General: Comply with PS 20 and grading rules of lumber grading agencies certified by American Lumber Standards Committee Board of Review as applicable.
  - 1. Factory mark each item of timber with grade stamp of grading agency.
  - 2. For exposed timber indicated to receive stained or natural finish, apply grade stamps to surfaces not exposed to view, or omit grade stamps and provide certificates of grade compliance issued by grading agency.
- B. Preservative Treatment:
  - 1. For sawn products, pressure treat timbers as required in architectural and structural drawings and within this section with preservative treatment to comply with AWPA U1-04 Use Category System, Commodity Specification A, Sawn Products. See Section 06071 for treatments and related requirements.
    - a. List products to be treated.
    - b. Products to be treated **[before]** **[after]** fabrication.
    - c. Specify conditioning (air dry, kiln dry, etc.), packaging, and handling after treating.
    - d. Specify treatment for post-treating fabrication.
  - 2. For posts, pressure treat poles as required in architectural and structural drawings and this section with preservative treatment to comply with AWPA U1-04 Use Category System, Commodity Specification B, Posts. See Section 06071 for treatments and related requirements.
    - a. List products to be treated.
    - b. Products to be treated **[before]** **[after]** fabrication.
    - c. Specify conditioning (air dry, kiln dry, etc.), packaging, and handling after treating.
    - d. Specify treatment for post-treating fabrication.
  - 3. For fire-retardant timber, pressure treat material as required in architectural and structural drawings and this section with treatment to comply with AWPA U1-04 Use Category System, Commodity Specification H, Fire Retardants. See Section 06071 for treatments and related requirements.

### 2.2 TIMBER

*[Note to Specifier: Use Paragraph A, B, or both to specify timber and performance requirement.]*

- A. Timber Species and Grade: **[Species]**; **[Select Structural]** **[No. 1]** **[No. 2]**.

- B. Timber performance requirements. Species and grade that comply with required structural properties for moisture content provided.
1. Allowable Stress Ratings for 12 inches (305 mm) Depth: [Fb 1500 psi (10.3 MPa) and E 1,500,000 psi (10 340 MPa)] [Fb 1300 psi (9.0 MPa) and E 1,300,000 psi (8 960 MPa)] <Insert values> [As indicated in drawings].

*[Note to Specifier: Edit grading rules based on applicability to species used.]*

C. Grading Rules: [NELMA, NHLA, NLGA, SPIB, WCLIB, or WWPA].

D. For large ([10] inch or greater maximum dimension) members, use box heart timbers. For small (less than [10] inch maximum dimension) members, use free of heart center timbers. Do not use timber with excessive reaction wood.

*[Note to specifier: Typical levels of moisture content in the industry are Green, 23%, 19% and 12%. Typical moisture meter pin lengths range between 1.25 inches and 3 inches which provide a reasonable method of verifying the dry condition. If the material is dry to specified level when dressed, it will likely be as dry or drier when fabricated or installed.]*

~~D.E.~~ Moisture Content: Provide timber [with [23][19xx] percent maximum moisture content x inches from surface at time of [dressing][fabrication][installation] ~~[unseasoned at time of dressing but with 19 percent maximum moisture content at time of installation].~~

~~E.F.~~ Dressing: Provide [dressed timber (S4S)] [timber that is rough sawn (Rgh)] unless otherwise indicated.

1. Round columns shall be hand peeled (shaved) from nominal S4S timbers. The minimum dressed diameter shall not be more than [1/2 inch] under nominal size indicated in drawings.

~~F.G.~~ Incising: To be performed by [treater] [timber supplier] [timber framer] for [specify] treated products.

~~G.H.~~ End Sealer: Manufacturer's standard, transparent, colorless wood sealer effective in retarding transmission of moisture at cross-grain cuts and compatible with finish.

~~H.I.~~ Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer compatible with finish.

~~H.J.~~ Cut members indicated as curved in drawings from stock having similar natural curves. Cross grain deviation greater than 1 in 10 is not permitted unless member is identified in the drawings as decorative only.

## 2.3 PEGS

- A. Use straight grain peg material with slope of grain not greater than 1:15, [clear hardwood][clear hardwood with minimum specific gravity of 0.57] [white oak] [other].

- B. Pegs shall be **[tapered a minimum one-third their length and at least 4 inches longer than thickness of timber in which they are driven] [uniform dowels with chamfered edges][octagon dowels with chamfered edges] [turned round pegs] [sawed octagonal pegs] [driven round] [square and shaved with draw knife (historical)].**

## 2.4 WEDGES

*[Note to Specifier: Detail wedge size and slope in drawing or indicate below.]*

- A. Use straight-grain wedge material with slope of grain not greater than 1:15. **Wedge material shall be [clear hardwood with minimum specific gravity of 0.57] [white oak] [other].**

## 2.5 FASTENERS

- A. General: Provide fasteners of size and type complying with requirements specified for material and manufacture.
  - 1. Where fasteners are exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide **[Type 304 stainless steel] [hot-dip galvanized] [other].**
- B. Wood Screws: ASME B18.6.1.

*[Note to Specifier: Edit proprietary fasteners indicated below as required for project.]*

- C. Proprietary Fasteners:
  - 1. RSS structural screws by GRK or accepted equivalent.
  - 2. Timberlok fasteners by FastenMaster or accepted equivalent.
  - 3. Strong Drive screws (SDS) by Simpson Strong-tie or accepted equivalent.
  - 4. WFC/WFR/WFD fasteners by SFS intec or accepted equivalent.
- D. Lag Bolts: ASME B18.2.1.

*[Note to Specifier: Verify washer requirements and edit paragraph 2.5E where bearing requirements are critical. Consider use of timber washers (ASTM A47) or plate washers versus structural steel washers (ASTM F 436)]*

- E. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- F. Threaded Rods: ASTM A 36.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain a load equal to 6 times the load imposed when installed in unit masonry assemblies and

equal to 4 times the load imposed when installed in concrete as determined by testing in accordance ASTM E 488, performed by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

H. Other proprietary connectors:

1. Timberlinx steel connectors by Timberlinx, Division of Michael Preston Distributors Limited or accepted equivalent.
2. Other.

## 2.6 STEEL CONNECTION MATERIALS

A. Unless otherwise indicated, fabricate steel connection materials and steel elements from the following materials:

1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36.
2. Round steel bars complying with ASTM A 575, Grade M 1020.
3. Hot-rolled steel sheet complying with ASTM A 1011, Structural Steel, Type SS, Grade 33.
4. Stainless steel plate and flat bars complying with ASTM A 666, Type [304] [316].
5. Stainless steel bars and shapes complying with ASTM A 276, Type [304] [316].
6. Stainless steel sheet complying with ASTM A 666, Type [304] [316].

B. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A 668/A 668M.

C. Use shear plates [2 5/8 inches] [4 inches] in diameter, complying with ASTM D 5933.

D. Finish:

1. Where not exposed to weather, finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.
2. Where exposed to weather, hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123/A 123M or ASTM A 153/A 153M.

## 2.7 FABRICATION

A. Shop fabricate members by cutting and restoring exposed surfaces to match specified surfacing. Predrill for fasteners and assembly of units.

1. Finish exposed surfaces to provide smooth finish. Surface texture shall be equivalent to that produced by [machine sanding with No. 120 grit sandpaper] [other requirement].

*[Note to Specifier: Delete subparagraph below if treated timber is not required.]*

2. Where preservative-treated members are specified, fabricate before treatment to greatest extent possible. Where fabrication must be done after treatment, apply field-treatment preservative to comply with AWWA M4.
  - a. Use inorganic boron treatment for members not in contact with ground and continuously protected from water.
  - b. Use copper naphthenate treatment for members in contact with ground or not continuously protected from water.
- B. Camber: Fabricate horizontal members and inclined members with slope of less than 1:1 with natural convex bow (crown) up to provide camber.
- C. Seal Coat: After fabricating and surfacing each unit, apply saturation coat of **[penetrating sealer]** **[tung oil]** **[landark finish]** on surfaces of each unit except for treated wood where treatment included water repellent.
- D. Timber sizes are **[nominal]** **[actual]** dimensions **[prior to shrinkage]** **[at the time of fabrication]**~~**[at the time of installation]**~~. Plane, adze, or otherwise dress timber to square, uniform dimension at joinery locations. Dressed dimensions shall not ~~be~~ **[more than 1/2 inch]**~~under size indicated in drawings~~ **[less than dimensions indicated in Product Standard PS20]** **[other]**.
- E. Waney edges are **[permitted provided they do not exceed 1/8] of a face. Remove bark and spokeshave or plane smooth waney edge** **[not permitted]**.
- F. Timbers with moderate bow are permitted where their intended use will straighten them. Place crowns up for spanning members. Do not use severely bowed timbers or timbers bowed in more than one direction.
- G. Remove staining from soil, oil, or grease.
- H. Chamfer exposed edges of beams and posts with ski tip stops.
- I. Cut mortise and tenon joints so there is 1/4-inch-minimum clearance between tendon end and mortise bottom to allow for shrinkage.
- J. Cut 1/4-inch chamfers on tenons on end grain edges.
- K. Cut joints accurately to make neat, snug fit.

*[Note to Specifier: Refer to TFEC-1 Standard for Design of Timber Frame Structures for non-mandatory end distance guideline when editing Paragraph 2.7 L.]*

- L. Drill peg holes to produce a tight fit at final assembly. When their location is not indicated in drawings, locate center line of hole **[2 inches]** from face of mortise.

*[Note to Specifier: Delete Paragraph 2.7M if drawbored connections are not used. Edit offsets as required.]*

- M. Offset peg holes on tenon from those in mortise, or drawbore, so that by driving a tapered peg through the offset holes, joint will be drawn tightly together, or drawpinned. Offset shall be [**1/8 inch**] for softwood timbers and [**3/32 inch**] for hardwood timber.
- N. Layout marks and identification marks shall not be visible on completed frame.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. General: Erect heavy timber construction true and plumb. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
- B. Handle and temporarily support heavy timber construction to prevent surface damage, compression, and other effects that might interfere with indicated finish. Tools used to drive or pull joints together shall not mar finished surface of timber.
- C. Framing adjacent to masonry: Provide 1/2-inch clearance at tops, sides, and ends of members adjacent to masonry unless otherwise indicated.
- D. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with finish and preservative treatment requirements for shop fabrication.
- E. Saw off pegs protruding on exterior of frame flush. Leave interior pegs protruding. Cut off pegs with mushroomed heads below damaged area.

### 3.2 STRUCTURAL TESTS AND INSPECTIONS

- A. Notify Special Inspector when structural framing is complete. Timber framing shall be inspected and approved prior to enclosing walls, floors, roofs, or ceilings.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged heavy timber construction if repairs are not approved by Architect.

END OF SECTION 06130