



AMERICAN INSTITUTE OF TIMBER CONSTRUCTION

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STANDARD FOR HEAVY TIMBER CONSTRUCTION

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1. HEAVY TIMBER CONSTRUCTION

1.1 "Heavy timber" construction is that type in which fire resistance is attained by placing limitations on the minimum size, thickness, or composition of all load-carrying wood members as given in this section; by avoiding concealed spaces under floors or roofs; by using approved fastenings, construction details, and adhesive; and by providing the required degree of fire resistance in exterior and interior walls.

2. HEAVY TIMBER FRAMING

2.1 COLUMNS

2.1.1 Wood columns may be sawn or glued laminated and shall be not less than 8 in., nominal, in any dimension when supporting floor loads and not less than 6 in., nominal, in width and not less than 8 in., nominal, in depth when supporting roof and ceiling loads only.

2.1.2 Columns shall be continuous or superimposed by means of reinforced concrete or metal caps with brackets, or shall be connected by properly designed steel or iron caps, with pintles and base plates, or by timber splice plates affixed to the columns by means of metal connectors housed within the contact faces, or by other approved methods.

2.2 FLOOR FRAMING

2.2.1 Beams and girders of wood may be sawn or glued laminated and shall be not less than 6 in., nominal, in width and not less than 10 in., nominal in depth.

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2.2.2 Framed or glued laminated arches which spring from grade or the floor line and support floor loads shall not be less than 8 in., nominal, in any dimension.

2.2.3 Framed timber trusses supporting floor loads shall have members of not less than 8 in., nominal, in any dimension.

2.3 ROOF FRAMING

2.3.1 Framed or glued laminated arches for roof construction which spring from grade or the floor line and do not support floor loads shall have members not less than 6 in., nominal, in width and not less than 8 in., nominal, in depth for the lower half of the height and not less than 6 in., nominal, in depth for the upper half.

2.3.2 Spaced members may be composed of two or more pieces not less than 3 in., nominal, in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate of not less than 2 in., nominal, in thickness, secured to the underside of the members. Splice plates shall not be less than 3 in., nominal, in thickness. When protected by approved automatic sprinklers under the roof deck, framing members shall be not less than 3 in., nominal, in width. Structural non-sawn or glued laminated timber, framed or glued laminated arches which spring from the top of the walls or wall abutments, framed timber trusses, and other wood framing members which do not support floor loads, shall have members not less than 4 in., nominal, in width and not less than 6 in., nominal in depth.

3. HEAVY TIMBER FLOORS

3.1 Floors shall be of sawn or glued laminated: (1) planks splined or tongue-and-groove, not less than 3 in., nominal, in thickness covered with 1 in., nominal, dimension tongue-and-groove flooring laid crosswise or diagonally to the plank or with other approved wearing surfaces, or (2) planks, not less than 4 in., nominal, in width set on edge close together and well spiked, and covered as for 3 in. thick plank. The planks shall be laid so that there is no continuous line of end joints except at points of support. Floors shall not extend closer than 1/2 in. to walls to provide an expansion joint, but the joint shall be covered at top or bottom to avoid flue action.

4. HEAVY TIMBER ROOF DECKS

4.1 Roof decks shall be of sawn or glued laminated: (1) planks, splined or tongue-and-groove, not less than 2 in., nominal, in thickness, (2) 1-1/8 in. thick tongue-and-groove interior plywood (exterior glue), or (3) planks, not less than 3 in., nominal, in width, set on edge close together and laid as required for floors. Other wood and/or wood-fiber based decking or other types of decking may be used if noncombustible.

5. WALLS

5.1 LOAD BEARING WALLS. Load Bearing portions of exterior and interior walls shall be of approved noncombustible material and shall have a fire resistance rating of not less than two hours except that, where a horizontal separation of 3 ft or less is provided, load bearing portions of exterior walls shall have a fire resistance rating of not less than three hours.

5.2 NON-LOAD BEARING WALLS. Non-load bearing portions of exterior walls shall be of approved noncombustible materials except as otherwise noted, and:

- 5.2.1 Where a horizontal separation of 3 ft or less is provided, non-load bearing exterior walls shall have a fire resistance rating of not less than three hours.
- 5.2.2 Where a horizontal separation of more than 3 ft but less than 20 ft is provided, non-load bearing exterior walls shall have a fire resistance rating of not less than two hours.
- 5.2.3 Where a horizontal separation of 20 to 30 ft is provided, non-load bearing exterior walls shall have a fire resistance rating of not less than one hour.
- 5.2.4 Where a horizontal separation of 30 ft or more is provided, no fire resistance rating is required.
- 5.2.5 Where a horizontal separation of 20 ft or more is provided, wood columns, arches, beams and roof decks conforming with heavy timber sizes may be used externally.

6. CONSTRUCTION DETAILS

- 6.1 Wall plate boxes of self-releasing type or approved hangers shall be provided where beams and girders enter masonry. An air space of 1 in. shall be provided at the top, end, and sides of the member unless approved durable or fire retardant treated wood is used.
- 6.2 Girders and beams shall be closely fitted around columns, and adjoining ends shall be cross tied to each other, or inter-tied by caps or ties, to transfer horizontal loads across the joint. Wood bolsters may be placed on top of columns which support roof loads only.
- 6.3 Where intermediate beams are used to support a floor, they shall be supported; (1) on the top of the girders, or (2) by ledgers or blocks securely fastened to the sides of the girders, or (3) by approved metal hangers into which the ends of the beam shall be closely fitted.
- 6.4 Wood beams and girders supported by walls required to have a fire resistance rating of two hours or more shall have not less than 4 in. of solid masonry between their ends and the outside face of the wall and between adjacent beams.
- 6.5 Columns, beams, girders, arches, trusses, and floors of materials other than wood shall have a fire resistance rating of not less than one hour.
- 6.6 Floors and roof decks shall be without concealed spaces, except that building service equipment may be enclosed provided the spaces between the equipment and enclosures are fire stopped or protected by other acceptable means.
- 6.7 Adequate roof anchorage shall be provided.

7. STANDARD DIMENSIONS FOR HEAVY TIMBER

- 7.1 Excellent fire resistance is achieved with "heavy timber" construction. Minimum sawn lumber sizes have been long established. They are expressed in nominal dimensions and assume surfacing to "American Lumber Standard" net sizes.

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7.2 For "heavy timber" construction, the net width of glued laminated structural members shall be the standard glued laminated net width for the nominal sawn width specified, and the net depth of glued laminated structural members shall be equal to or greater than the net finished depth specified by the following table.

Minimum Nominal Size			Minimum Glued Laminated Net Size					
			1-1/2 in. thick laminations			1-3/8 in. thick laminations		
Width, in.		Depth., in.	Width, in.		Depth, in.	Width, in.		Depth, in.
8	x	8	6-3/4	x	9	6-3/4	x	8-1/4
6	x	10	5-1/8	x	10-1/2	5 or 5-1/8	x	11
6	x	8	5-1/8	x	9	5 or 5-1/8	x	8-1/4
6	x	6	5-1/8	x	6	5 or 5-1/8	x	6-7/8
4	x	6	3-1/8	x	7-1/2	3 or 3-1/8	x	6-7/8