CHAPTER 6

TYPES OF CONSTRUCTION

SECTION 601
GENERAL

601.1 Scope. The provisions of this chapter shall control the classification of buildings as to type of construction.

SECTION 602
CONSTRUCTION CLASSIFICATION

602.1 General. Buildings and structures erected or to be erected, altered or extended in height or area shall be classified in one of the five construction types defined in Sections 602.2 through 602.5. The building elements shall have a *fire-resistance rating* not less than that specified in Table 601 and exterior walls shall have a *fire-resistance rating* not less than that specified in Table 602. Where required to have a *fire-resistance rating* by Table 601, building elements shall comply with the applicable provisions of Section 703.2. The protection of openings, ducts and air transfer openings in building elements shall not be required unless required by other provisions of this code.

602.1.1 Minimum requirements. A building or portion thereof shall not be required to conform to the details of a type of construction higher than that type which meets the minimum requirements based on occupancy even though certain features of such a building actually conform to a higher type of construction.

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A	B	A	B	HT	A	B
Primary structural frame[f] (see Section 202)	3[a]	2[a]	1	0	1	0	HT	1	0
Bearing walls									
Exterior[e, f]	3	2	1	0	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interiord	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and associated *secondary members* (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated *secondary members* (see Section 202)	11/2 [b]	1[b, c]	1[b, c]	0[c]	1[b, c]	0	HT	1[b, c]	0

For SI: 1 foot =304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.

d. Not less than the fire-resistance rating required by other sections of this code.

e. Not less than the fire-resistance rating based on *fire separation distance* (see Table 602).

f. Not less than the fire-resistance rating as referenced in Section 704.10.

Note: See Sections 1019, 1023 and 603.1 item 27 for stairway construction.

g. The fire-resistance rating for mezzanines constructed in accordance with Section 505.2 need not exceed 1 hour.

602.2 Types I and II. Types I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials, except as permitted in Section 603 and elsewhere in this code.

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within *exterior wall* assemblies of a 2-hour rating or less.

Interpretation I602.3: Type IIIA buildings are permitted to include exposed heavy-timber construction for columns, beams, girders, arches, trusses, floors and roof decks except for fire-resistive construction required by Sections 510 and 713 and Chapter 10.

602.4 Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.1 or 602.4.2 shall be permitted. Minimum solid sawn nominal dimensions are required for structures built using Type IV construction (HT). For glued-laminated members and structural composite lumber (SCL) members, the equivalent net finished width and depths corresponding to the minimum nominal width and depths of solid sawn lumber are required as specified in Table 602.4. *Cross-laminated timber* (CLT) dimensions used in this section are actual dimensions.

602.4.1 Fire-retardant-treated wood in exterior walls. *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within exterior wall assemblies with a 2-hour rating or less.

602.4.2 Cross-laminated timber in exterior walls. *Cross-laminated timber* complying with Section 2303.1.4 shall be permitted within exterior wall assemblies with a 2-hour rating or less, provided the exterior surface of the cross-laminated timber is protected by one the following:

1. *Fire-retardant-treated wood* sheathing complying with Section 2303.2 and not less than $^{15}/_{32}$ inch (12 mm) thick;
2. *Gypsum board* not less than $^{1}/_{2}$ inch (12.7 mm) thick; or
3. A noncombustible material.

TABLE 602.4
WOOD MEMBER SIZE EQUIVALENCIES

MINIMUM NOMINAL SOLID SAWN SIZE		MINIMUM GLUED-LAMINATED NET SIZE		MINIMUM STRUCTURAL COMPOSITE LUMBER NET SIZE	
Width, inch	Depth, inch	Width, inch	Depth, inch	Width, inch	Depth, inch
8	8	$6^{3}/_{4}$	$8^{1}/_{4}$	7	$7^{1}/_{2}$
6	10	5	$10^{1}/_{2}$	$5^{1}/_{4}$	$9^{1}/_{2}$
6	8	5	$8^{1}/_{4}$	$5^{1}/_{4}$	$7^{1}/_{2}$
6	6	5	6	$5^{1}/_{4}$	$5^{1}/_{2}$
4	6	3	$6^{7}/_{8}$	$3^{1}/_{2}$	$5^{1}/_{2}$

For SI: 1 inch = 25.4 mm.

602.4.3 Columns. Wood columns shall be sawn or glued laminated and shall be not less than 8 inches (203 mm), nominal, in any dimension where supporting floor loads and not less than 6 inches (152 mm) nominal in width and not less than 8 inches (203 mm) nominal in depth where supporting roof and ceiling loads only. Columns shall be continuous or superimposed and connected in an *approved* manner. Protection in accordance with Section 704.2 is not required.

602.4.4 Floor framing. Wood beams and girders shall be of sawn or glued-laminated timber and shall be not less than 6 inches (152 mm) nominal in width and not less than 10 inches (254 mm) nominal in depth. Framed sawn or glued-laminated timber arches, which spring from the floor line and support floor loads, shall be not less than 8

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a,d,g,i]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[e]	OCCUPANCY GROUP F-1, M, S-1[f]	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2, U[h]
$X < 5^{b}$	All	3	2	1
$5 \le X < 10$	IA	3	2	1
	Others	2	1	1
$10 \le X < 30$	IA, IB	2	1	1[c]
	IIB, VB	1	0	0
	Others	1	1	1[c]
$X \ge 30$	All	0	0	0

For SI: 1 foot =304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

b. See Section 706.1.1 for party walls.

c. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.

d. The fire-resistance rating of an exterior wall is determined based upon the *fire separation distance* of the exterior wall and the *story* in which the wall is located.

e. For special requirements for Group H occupancies, see Section 415.6.

f. For special requirements for Group S aircraft hangars, see Section 412.4.1.

g. Where Table 705.8 permits nonbearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.

h. For a building containing only a Group U occupancy private garage or carport, the exterior wall shall not be required to have a fire-resistance rating where the *fire separation distance* is 5 feet (1523 mm) or greater.

i. *Existing buildings* may encroach a maximum of 4 inches into the required *fire separation distance*, solely for the purpose of adding insulation to the building exterior.

602.4.5 Roof framing. Wood-frame or glued-laminated arches for roof construction, which spring from the floor line or from grade and do not support floor loads, shall have members not less than 6 inches (152 mm) nominal in width and have not less than 8 inches (203 mm) nominal in depth for the lower half of the height and not less than 6 inches (152 mm) nominal in depth for the upper half. Framed or glued-laminated arches for roof construction that spring from the top of walls or wall abutments, framed timber trusses and other roof framing, which do not support floor loads, shall have members not less than 4 inches (102 mm) nominal in width and not less than 6 inches (152 mm) nominal in depth. Spaced members shall be permitted to be composed of two or more pieces not less than 3 inches (76 mm) nominal in thickness where blocked solidly throughout their intervening spaces or where spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) nominal in thickness secured to the underside of the members. Splice plates shall be not less than 3 inches (76 mm) nominal in thickness. Where protected by *approved* automatic sprinklers under the roof deck, framing members shall be not less than 3 inches (76 mm) nominal in width.

602.4.6 Floors. Floors shall be without concealed spaces. Wood floors shall be constructed in accordance with Section 602.4.6.1 or 602.4.6.2.

602.4.6.1 Sawn or glued-laminated plank floors. Sawn or glued-laminated plank floors shall be one of the following:

1. Sawn or glued-laminated planks, splined or tongue-and-groove, of not less than 3 inches (76 mm) nominal in thickness covered with 1-inch (25 mm) nominal dimension tongue-and-groove flooring, laid crosswise or diagonally, $^{15}/_{32}$-inch (12 mm) wood structural panel or $^{1}/_{2}$-inch (12.7 mm) particleboard.
2. Planks not less than 4 inches (102 mm) nominal in width set on edge close together and well spiked and covered with 1-inch (25 mm) nominal dimension flooring or $^{15}/_{32}$-inch (12 mm) wood structural panel or $^{1}/_{2}$-inch (12.7 mm) particleboard.

The lumber shall be laid so that no continuous line of joints will occur except at points of support. Floors shall not extend closer than $^{1}/_{2}$ inch (12.7 mm) to walls. Such $^{1}/_{2}$-inch (12.7 mm) space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinkage movements of the floor. Corbelling of masonry walls under the floor shall be permitted to be used in place of molding.

602.4.6.2 Cross-laminated timber floors. *Cross-laminated timber* shall be not less than 4 inches (102 mm) in thickness. *Cross-laminated timber* shall be continuous from support to support and mechanically fastened to one another. *Cross-laminated timber* shall be permitted to be connected to walls without a shrinkage gap providing swelling or shrinking is considered in the design. Corbelling of masonry walls under the floor shall be permitted to be used.

602.4.7 Roofs. Roofs shall be without concealed spaces and wood roof decks shall be sawn or glued laminated, splined or tongue-and-groove plank, not less than 2 inches (51 mm) nominal in thickness; $1^{1}/_{8}$-inch-thick (32 mm) wood structural panel (exterior glue); planks not less than 3 inches (76 mm) nominal in width, set on edge close together and laid as required for floors; or of cross-laminated timber. Other types of decking shall be permitted to be used if providing equivalent fire resistance and structural properties.

Cross-laminated timber roofs shall be not less than 3 inches (76 mm) nominal in thickness and shall be continuous from support to support and mechanically fastened to one another.

602.4.8 Partitions and walls. Partitions and walls shall comply with Section 602.4.8.1 or 602.4.8.2.

602.4.8.1 Interior walls and partitions. Interior walls and partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick, or of 1-hour fire-resistance-rated construction.

602.4.8.2 Exterior walls. Exterior walls shall be of one of the following:

1. Noncombustible materials.
2. Not less than 6 inches (152 mm) in thickness and constructed of one of the following:
   2.1. *Fire-retardant-treated wood* in accordance with Section 2303.2 and complying with Section 602.4.1.
   2.2. *Cross-laminated timber* complying with Section 602.4.2.

602.4.9 Exterior structural members. Where a horizontal separation of 20 feet (6096 mm) or more is provided, wood columns and arches conforming to heavy timber sizes shall be permitted to be used externally.

602.5 Type V. Type V construction is that type of construction in which the structural elements, *exterior walls* and interior walls are of any materials permitted by this code.

Interpretation I602.5: Type VA buildings are permitted to include exposed heavy-timber construction for columns, beams, girders, arches, trusses, floors and roof decks except for fire-resistive construction required by Sections 510 and 713 and Chapter 10.

SECTION 603
COMBUSTIBLE MATERIAL IN TYPES I AND II CONSTRUCTION

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:
   1.1. Nonbearing partitions where the required *fire-resistance rating* is 2 hours or less.
   1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.
   1.3. Roof construction, including girders, trusses, framing and decking.

   Exception: In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).
2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

   Exceptions:
   1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.
   2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not more than 200.
3. Foam plastics in accordance with Chapter 26.
4. Roof coverings that have an A, B or C classification.
5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.
6. Millwork such as doors, door frames, window sashes and frames.
7. *Interior wall and ceiling finishes* installed in accordance with Sections 801 and 803.
8. *Trim* installed in accordance with Section 806.
9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
10. Finish flooring installed in accordance with Section 805.
11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated wood*, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
12. Stages and platforms constructed in accordance with Sections 410.3 and 410.4, respectively.
13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14.
14. Blocking such as for handrails, millwork, cabinets and window and door frames.
15. Light-transmitting plastics as permitted by Chapter 26.
16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.
17. Exterior plastic veneer installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.13.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.7 and 1406.3.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.14 and 1705.15, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect joints in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the *International Mechanical Code*.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m^2), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
27. Stairways within individual *dwelling units* and stairways serving a single tenant space are permitted to be of fire-retardant-treated wood or heavy-timber construction. In other than Group R occupancies, such stairways shall not serve as a required means of egress.
28. Stairways complying with Section 510.2, item 4.
29. Aluminum is permitted as follows:
    29.1 Where combustible materials, including fire retardant treated wood, are allowed by the code;
    29.2 For structural members supporting less than 500 square feet that do not have direct connections to columns and bracing members designed to carry gravity loads;
    29.3 In curtain walls *approved* or listed for use in non-combustible construction; and

29.4 Unprotected aluminum frames for *awnings* in accordance with Section 3105.5.

603.1.1 Ducts. The use of nonmetallic ducts shall be permitted where installed in accordance with the limitations of the *International Mechanical Code*.

603.1.2 Piping. The use of combustible piping materials shall be permitted where installed in accordance with the limitations of the *International Mechanical Code* and the ((~~International~~)) *Uniform Plumbing Code*.

603.1.3 Electrical. The use of electrical wiring methods with combustible insulation, tubing, raceways and related components shall be permitted where installed in accordance with the limitations of this code.