

# **STANDARD BUILDING CODE<sup>®</sup>** **1997 EDITION**



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## CHAPTER 3 OCCUPANCY CLASSIFICATION

### SECTION 301 GENERAL

**301.1 Scope.** Provisions of this chapter shall govern the classification of building occupancies.

**301.2 Occupancy or use categories.** Every new and existing building, structure or part thereof shall, for the purpose of this code, be classified according to its use, or occupancy as a building or structure of one of the following occupancy groups:

- Group A –Assembly (see 304)
- Group B –Business (see 305)
- Group E –Educational (see 306)
- Group F –Factory Industrial (see 307)
- Group H –Hazardous (see 308)
- Group I –Institutional (see 309)
- Group M –Mercantile (see 310)
- Group R –Residential (see 311)
- Group S –Storage (see 312)

**301.3 Uncertain classification.** Each occupancy group is intended to include buildings as hereinafter defined and those of similar character or use. Wherever there is any uncertainty as to the classification of a building, the building official shall determine the classification within which it falls, according to the life safety and relative fire hazard involved.

### SECTION 302 DEFINITIONS

For definitions, see Chapter 2.

### SECTION 303 MIXED OCCUPANCIES

**303.1 Multiple occupancies.** A building that is used for two or more occupancies, classified within different occupancy groups, shall be considered a mixed occupancy building.

**Exception:** A building containing two or more occupancies, none of them Group H, may be considered a single occupancy when:

1. The required type of construction for the building is determined by applying the height and area limitations for each of the applicable occupancy groups to the entire building with the most restrictive type of construction requirements being applied, and
2. The entire building conforms with the most restrictive occupancy group fire protection requirements, as determined by Chapter 7 and 8, and
3. The entire building conforms with the most restrictive occupancy group sprinkler, standpipe and alarm

system requirements, as determined by Chapter 9, and

4. All other requirements of this code are applied to each portion of the building based on the use of that space.

**303.2 Height and area.** A mixed occupancy building shall be governed by the height and area limitations applying to the principal intended use. However each portion of the building shall conform to all other requirements of this code for the occupancy contained therein. Accessory occupancies shall not exceed the area limitation nor be located at a height greater than that permitted for such occupancy group in the type of construction being used.

### SECTION 304 ASSEMBLY OCCUPANCY— GROUP A

#### 304.1 Scope

**304.1.1** Group A occupancy is the use of a building or structure, or any portion thereof, for the gathering together of persons for purposes such as civic, social or religious functions or for recreation, or for food or drink consumption or awaiting transportation.

**304.1.2** Group A occupancy shall include, among others, the following:

- |                          |                               |
|--------------------------|-------------------------------|
| Amusement Park Buildings | Passenger Depots              |
| Auditoriums              | Public Assembly Halls         |
| Churches                 | Recreation Halls              |
| Dance Halls              | Restaurants                   |
| Gymnasiums               | Stadiums and Grandstands      |
| Motion Picture Theaters  | Tents for Assembly            |
| Museums                  | Theaters for Stage Production |

#### 304.2 Subclassifications

**304.2.1** Assembly occupancies shall be divided into two subclassifications as set forth in this section, both of which shall comply with the requirements for Group A occupancy unless otherwise specified:

1. A-1: Large Assembly shall include theaters and other places of assembly with an occupant load of 1,000 or more persons. Large Assembly shall also include theaters and other places of assembly with a stage requiring proscenium opening protection and with an occupant load of 700 or more persons.
2. A-2: Small Assembly shall include theaters and other places of assembly with or without a stage requiring proscenium opening protection and with an occupant load of 100 or more persons, but with an occupant load less than designated for Large Assembly.

**304.2.2** Assembly occupancies with an occupant load less than 100 persons shall be classified as Group B.

### **SECTION 305 BUSINESS OCCUPANCY – GROUP B**

#### **305.1 Scope**

**305.1.1** Group B occupancy is the use of a building or structure, or any portion thereof, for office, professional, or service type transactions including normal accessory storage and the keeping of records and accounts.

**305.1.2** Group B occupancy shall include, among others, the following:

Animal hospitals, kennels, pounds	Electronic data processing areas
Automobile and other motor vehicle showrooms	Florist and nurseries
Automobile or other vehicle service stations	General post offices
Banks	Greenhouses
Barber shops	Laboratories; testing and research (nonhazardous)
Beauty shops	Laundries; pickup and delivery stations and self-service
Bowling alleys	Libraries (other than school)
Carwashes	Office buildings
Civic administration areas	Police stations
Clinics - outpatient	Print shops
Dry cleaning; pick-up and delivery stations and self-service	Professional services; attorney, dentists, physician, engineer, etc.
Educational occupancies above the 12th grade	Radio and television stations
	Telephone exchanges

**305.1.3** Assembly occupancies with an occupant load less than 100 persons shall be classified as Group B.

**Exception:** Provisions of 403.1.3.4, 403.2, 403.3, 1019.10, 1019.11 and 3103 shall apply to buildings used for assembly purposes, regardless of occupant load.

**305.1.4** Dry cleaning establishments using solvents which are nonflammable or nonflammable at ordinary temperatures and only moderately flammable at higher temperatures (Class IV System) shall be classified as Group B occupancy.

### **SECTION 306 EDUCATIONAL OCCUPANCY–GROUP E**

#### **306.1 Scope**

**306.1.1** Group E occupancy is the use of a building or structure, or any portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

**306.1.2** Child care facilities which accommodate six or more children of any age who stay less than 24 hours per day shall be classified as Group E.

**306.1.3** Parts of buildings used for the congregating or gathering of 100 or more persons in one room shall be classified as Group A occupancy, regardless of whether or not such gathering is of an educational or instructional nature.

**306.1.4** Schools for business or vocational training shall be classified in the same occupancies and conform to the same requirements as the trade, vocation or business taught, provided the concentration of persons will not exceed that listed in 1003 for the occupancy classification used.

### **SECTION 307 FACTORY-INDUSTRIAL OCCUPANCY–GROUP F**

#### **307.1 Scope**

**307.1.1** Group F occupancy is use of a building or structure, or any portion thereof, for assembling, disassembling, repairing, fabricating, finishing, manufacturing, packaging or processing operations that are not otherwise classified in this code.

**307.1.2** Group F occupancy shall include, among others, the occupancies listed in this section, but does not include buildings used principally for any purpose involving highly combustible, flammable, or explosive products or materials. See 308.

Assembly Plant	Mill
Factory	Processing Plant
Manufacturing Plant	

**307.1.3** Portions of Group F occupancy involving highly combustible, flammable or explosive products or materials shall be properly ventilated, protected and separated from the remainder of the building in accordance with the appropriate NFPA Standard or the entire building will be classified as Hazardous occupancy. See 308.

### **SECTION 308 HAZARDOUS OCCUPANCY–GROUP H**

**308.1 Scope.** Group H occupancy is the principal use of a building or structure, or any portion thereof, that involves the manufacturing, processing, generation, storage, or other use of hazardous materials in excess of the exempt quantities listed in this section.

#### **308.2 Subclassification**

**308.2.1** Group H hazardous occupancies shall be divided into H1 through H4 according to the hazards presented by each material as described below:

**H1:** Buildings or parts thereof used for the manufacturing, processing, generation or storage of materials which present a detonation hazard. Detonation hazards include explosives, blasting agents, pyrotechnic special effect materials, display fireworks (1.3G, Class B, special) and consumer fireworks (1.4G, Class C, Common) manufacturing, Class 4 liquid and solid oxidizers, unclassified detonatable organic peroxides, and

Class 3 and 4 detonatable unstable (reactive) materials in excess of the amounts given in Table 308.2A.

**H2:** Buildings or parts thereof used for the manufacturing, processing, generation or storage of materials which present a deflagration hazard or a hazard from accelerated burning. Deflagration hazards include Class I, II and III-A flammable or combustible liquids in open containers or containers pressurized at more than 15 psi (103 kPa), combustible dusts stored in piles or within open containers, Class 3 liquid and solid oxidizers, Class I organic peroxides, solid, liquid and gaseous pyrophorics, Class 3 nondetonatable unstable (reactive) materials and flammable cryogenic fluids in excess of the amounts given in Table 308.2B.

**H3:** Buildings or parts thereof used for the manufacturing, processing, generation or storage of materials which readily support combustion or present a physical hazard. Physical hazards include storage of consumer fireworks (1.4G, Class C, Common) except at fireworks manufacturing plants, Class I, II, and III flammable and combustible liquids in closed containers pressurized at 15 psi (103 kPa) or less, Level 2 and Level 3 aerosol products, flammable solids, Class 1 and 2 liquid and solid oxidizers, Class II, III, or IV organic peroxides, Class 1 and 2 unstable (reactive) materials, water reactive materials, and oxidizing cryogenic fluids in excess of the amounts given in Table 308.2C.

**H4:** Buildings or parts thereof used for the manufacturing, processing, generation or storage of materials which are health hazards. Health hazards include toxic and toxic compressed gases, highly toxic and toxic solids and liquids, corrosives, irritants, sensitizers, and other health hazard solids, liquids and gases in excess of the amounts given in Table 308.2D.

#### Exceptions to 308.2.1:

1. The quantities of alcoholic beverages in retail sales uses are unlimited provided the liquids are packaged in individual containers not exceeding 1 gal (3.79 L).
2. The quantities of medicines, foodstuffs and cosmetics containing not more than 50% by volume of water miscible flammable liquids and with the remainder of the solution not being flammable are unlimited when packaged in containers not exceeding 1 gal (3.79 L).
3. Mercantile occupancies: Storage of flammable and combustible liquids shall be limited to quantities needed for display and normal merchandising purposes but shall not exceed the quantities permitted in the Standard Fire Prevention Code.

4. Explosives, Blasting Agents and Ammunition preempted by the requirements of Chapters 19 and 20 of the Standard Fire Prevention Code.
5. Refrigeration systems.
6. Storage, use and handling of pesticides and agricultural materials used for weed abatement, pest control, erosion control, soil amendments or similar application for use on the premises.
7. Materials contained within fuel tanks or batteries on automobiles.
8. Stationary batteries used for facility emergency power, uninterrupted power supply or telecommunication facilities, provided that the batteries are provided with safety venting caps and sufficient ventilation to produce a vapor-air mixture which is less than 25% of the lower explosive limit.
9. Control areas in accordance with 308.2.2.
10. Corrosives, irritants and sensitizers shall not include commonly used building materials.
11. Corrosives, irritants and sensitizers shall not include personal or household products in their original packaging for retail display.
12. Level 1 aerosol products shall be considered equivalent to a Class III commodity, as defined by NFPA 30B and the Standard Fire Prevention Code.
13. Buildings and structures and associated equipment used for compression, storage and dispensing of compressed natural gas (CNG) that conform with Section 407.18 and defined as out-doors.

**308.2.2** Control areas containing hazardous material not exceeding the exempt quantities shall be permitted in all occupancies except assembly occupancies. The control area shall be separated by 1-hour fire resistant construction with 3/4-hour opening protection with self-closing or automatic closing device in accordance with 705.1.3.2.3. The maximum number of control areas per floor in multi-story buildings shall be limited to four. The maximum number of control areas in any building shall be limited to ten. When control areas are on different floors but adjacent to each other, the floor/ceiling between these control areas shall have not less than 2-hour fire resistant construction. When the floor/ceiling assembly forms part of the separation, the separation walls of the control area shall extend from the floor below to the floor deck above.

**308.2.3** When the stored amount of any hazardous material listed in tables 308.2A through 308.2D is exceeded in any one control area, such storage shall be within a room or building conforming to the code requirements for H1, H2, H3 or H4 occupancies.

**308.2.4** Multiple Hazards. Materials representing hazards that are classified in one or more of the H occupancy subgroups shall conform to the code requirements for each of the use groups represented.

TABLE 308.2A - TABLE 308.2B

TABLE 308.2A  
EXEMPT QUANTITIES OF H1 MATERIALS

CONDITIONS	EXPLOSIVES AND BLASTING AGENTS <sup>1,6</sup>		LIQUID AND SOLID OXIDIZERS <sup>2,3,4</sup> (lbs) CLASS 4	ORGANIC PEROXIDES <sup>2,5</sup> (lbs) UD	UNSTABLE (REACTIVE) MATERIALS (DETONATABLE) <sup>2,5</sup>			
	Solids (lbs)	Liquids (gals)			CLASS 3		CLASS 4	
					Solids & Liquids (lbs)	Gases (cu ft)	Solids & Liquids (lbs)	Gases (cu ft)
unprotected by sprinklers or cabinet	0	0	0	0	5	50	0	0
within cabinet in unsprinklered building	0	0	0	0	10	100	0	0
in sprinklered building, not in cabinet	1	0.10	1	1	10	100	1	10
in sprinklered building, within cabinet	2	0.20	2	2	20	200	2	20

For SI: 1 lb = 0.4536 kg, 1 gal = 3.7854 L, 1 cu ft = 0.02832 m<sup>3</sup>.

UD = Unclassified Detonatable.

## Notes:

1. Storage of pyrotechnic special effect materials in motion picture, television, theatrical and group entertainment production when under permit amount as specified in Chapter 20 of the Standard Fire Prevention Code.
2. A conversion of 10 lbs/gal shall be used.
3. No exempt amounts are permitted in Group A, E, M, or R, or offices of Group B occupancies.
4. No exempt amounts are permitted in Group I occupancies or in classrooms or laboratories of Group B unless storage is within a hazardous material storage cabinet containing no other storage.
5. Except for laboratories in Group B occupancies, materials are not permitted in Group A, B, E, I, M and R occupancies.
6. Allowable quantities for retail display and storage are specified in Chapter 19 of the Standard Fire Prevention Code.

TABLE 308.2B  
EXEMPT QUANTITIES OF H2 MATERIALS

CONDITIONS	FLAMMABLE AND COMBUSTIBLE LIQUIDS IN OPEN CONTAINERS OR CONTAINERS PRESSURIZED AT MORE THAN 15 PSIG (gal) <sup>1</sup>						COMBUSTIBLE DUSTS STORED IN PILES OR OPEN CONTAINERS (lbs)	LIQUID AND SOLID OXIDIZERS (lbs) <sup>3,4</sup>	ORGANIC PEROXIDES (lbs) <sup>3,5</sup>	PYROPHORIC MATERIALS <sup>3,5</sup>		UNSTABLE REACTIVES <sup>5</sup> (NONDETONATABLE)			
	Class									Solid & Liquid (lbs)		CLASS 3		Gases (cu ft)	Flammable Cryogenic Fluids (gal)
	IA	IB	IC	IA <sup>2</sup> IB <sup>2</sup> IC <sup>2</sup>	II	IIIA				Solid & Liquid (lbs)	Gases (cu ft)	Solid & Liquid (lbs)	Gases (cu ft)		
unprotected by sprinklers or cabinet	30	60	90	120	120	330	125	10	5	0	0	5	50	45	
within cabinet in unsprinklered building	60	120	180	240	240	660	250	20	10	0	0	10	100	45	
in sprinklered building, not in cabinet	60	120	180	240	240	660	250	20	10	4	50	10	100	90	
in sprinklered building, within cabinet	120	240	360	480	480	1,320	500	40	20	8	100	20	200	90	

For SI: 1 lb = 0.4536 kg, 1 gal = 3.7854 L, 1 cu ft = 0.02832 m<sup>3</sup>.

## Notes:

1. For storage requirements see Chapter 9 of the Standard Fire Prevention Code.
2. Containing not more than the exempt amounts of Class IA, IB, IC, flammable liquids.
3. A conversion of 10 lbs/gal shall be used.
4. A maximum quantity of 200 lbs of solid or 20 gallons may be permitted in I, M, and R occupancies when necessary for maintenance purposes or operation of equipment.
5. Except for laboratories in Group B occupancies, material is not permitted in Group A, B, E, I, M and R occupancies.

**TABLE 308.2C  
EXEMPT QUANTITIES OF H3 MATERIALS**

CONDITIONS	FLAMMABLE AND COMBUSTIBLE LIQUIDS IN CLOSED CONTAINERS PRESSURIZED AT 15 PSIG OR LESS (gal) <sup>1</sup>										UNSTABLE MATERIALS <sup>3</sup>								Water Reactive <sup>3</sup> (lbs)			Flammable Or Oxidizing Cryogenic Fluids	
	IA	IB	IC	CLASS				Flammable Solids (lbs) <sup>4</sup>	Liquid & Solid Oxidizers (lbs) <sup>3</sup> CLASS		Organic Peroxides <sup>3</sup> (lbs) CLASS			Class 1 Solid & Liquid (lbs)		Class 2 Solid & Liquid (lbs)		Gases (cu ft)		CLASS			90
				IA <sup>2</sup> IB <sup>2</sup> IC <sup>2</sup>	II	IIIA	IIIB		1	2	II	III	IV	125	750	50	250	1	2	3			
1	2	II	III	IV	(lbs)	(cu ft)	(lbs)	(cu ft)	1	2	3												
unprotected by sprinklers or cabinet	30	60	90	120	120	330	13,200	125	1,000	250	50	125	500	125	750	50	250	NL	50	5	45		
within cabinet in unsprinklered building	60	120	180	240	240	660	26,400	250	2,000	500	100	250	1,000	250	1,500	100	500	NL	100	10	45		
in sprinklered building, not in cabinet	60	120	180	240	240	660	NL	250	2,000	500	100	250	1,000	250	1,500	100	500	NL	100	10	90		
in sprinklered building, within cabine	120	240	360	480	480	1,320	NL	500	4,000	1,000	200	500	2,000	500	3,000	200	2,000	NL	200	20	90		

For SI: 1 lb = 0.4536 kg, 1 gal = 3.7854 L, 1 cu ft = 0.02832 m<sup>3</sup>.

**Notes:**

1. For storage requirements see Chapter 9 of the Standard Fire Prevention Code.
2. Containing not more than the exempt amounts of Class IA, IB, or IC flammable liquids.
3. A conversion of 10 lbs/gal shall be used.
4. For baled combustible fibers the exempt quantities shall be 1,000 cu ft, 2,000 cu ft, 2,000 cu ft and 4,000 cu ft for the respective conditions.

**TABLE 308.2D  
EXEMPT QUANTITIES OF H4 MATERIALS**

CONDITIONS	HIGHLY TOXIC GASES <sup>1,2</sup> (CU FT)	TOXIC COMPRESSED GASES <sup>1,2,4</sup> (CU FT)	HIGHLY TOXIC AND TOXIC SOLIDS AND LIQUID <sup>3</sup> (lbs)		CORROSIVES, IRRITANTS, SENSITIZERS, AND HEALTH HAZARD SOLIDS, LIQUIDS, AND GASES		
			Highly Toxic	Toxic	Solids (lbs)	Liquids (gals)	Gases (cu ft)
unprotected by sprinklers or cabinets	0	650	1	500	5,000	500	650
within cabinet in unsprinklered building	20	1,300	2	1,000	10,000	1,000	1,300
in sprinklered building, not in cabinet	0	1,300	2	1,000	10,000	1,000	1,300
in sprinklered building, within cabinet	40	2,600	4	2,000	20,000	2,000	2,600

For SI: 1 lb = 0.4536 kg, 1 gal = 3.7854 L, 1 cu ft = 0.02832 m<sup>3</sup>.

**Notes:**

1. No exempt amounts are permitted in Group A, M, R and offices in Group B occupancies.
2. Except for cylinders not exceeding 20 cu ft stored within a gas storage cabinet or fume hood, no exempt amounts are permitted in Group E or I occupancies or in classrooms.
3. A conversion of 10 lbs/gal shall be used.
4. Compressed chlorine gas shall have an exempt amount of 810 cu ft.

## SECTION 309 INSTITUTIONAL OCCUPANCY – GROUP I

**309.1 Group I Unrestrained Occupancy.** Group I Unrestrained includes buildings or portions thereof used for medical, surgical, psychiatric, nursing, or custodial care on a 24 hour basis of six or more persons who are not capable of self-preservation and shall include among others:

- Detoxification Facilities
- Hospitals
- Mental hospitals
- Nursing homes
- (both intermediate care facilities and skilled nursing facilities).

Facilities such as the above with five or less persons not ancillary to other uses shall be classified as a residential occupancy.

**309.2 Group I Restrained Occupancy.** Group I Restrained includes buildings or portions thereof which provide sleeping accommodations for six or more persons under some degree of restraint or security who are generally incapable of self-preservation due to security measures not under the occupant's control and shall include among others:

- Correctional Institutions
- Detention Centers
- Jails
- Reformatories

**Exception:** Group I Restrained qualifying for Use Condition 1 may be classified as a Group R occupancy.

## SECTION 310 MERCANTILE OCCUPANCY–GROUP M

**310.1 Scope.** Group M occupancy is the use of a building or structure or any portion thereof, for the display and sale of merchandise including stocks of goods, wares or merchandise incidental to such purposes and accessible to the public and shall include, among others, the following:

- Department stores
- Drug stores
- Markets
- Retail stores
- Sales rooms
- Shopping centers
- Wholesale stores (other than warehouses)

## SECTION 311 RESIDENTIAL OCCUPANCY–GROUP R

**311.1 Scope.** Group R occupancy is the use of a building or structure, or any portion thereof, for sleeping accommodations not classed as a Group I occupancy.

**311.2 Subclassifications.** Group R occupancies shall include, among others, the following:

- R1: Residential occupancies where the occupants are primarily transient in nature including:
  - Boarding housing (transient)

Hotels  
Motels

- R2: Multiple dwellings where the occupants are primarily permanent in nature, including:

- Apartment houses
- Convents
- Dormitory facilities which accommodate six or more persons of more than 2 1/2 years of age who stay more than 24 hours.
- Fraternities and sororities
- Monasteries
- Rectories
- Rooming houses (not transient)

- R3: Residential occupancies including the following:

- Child care facilities which accommodate five or less children of any age for any time period.
- One and two family dwellings where the occupants are primarily permanent in nature and not classified as R1, R2, or I.
- Rooming houses (transient)

- R4: Residential Care/Assisted Living Facilities housing six or more occupants on a 24 hour basis; these occupancies include the following:

- Alcohol and drug abuse centers
- Assisted living facilities
- Congregate care facilities
- Convalescent facilities
- Halfway houses
- Group homes
- Residential board and care facilities
- Social rehabilitation facilities

## SECTION 312 STORAGE OCCUPANCY–GROUP S

**312.1 Scope.** Group S occupancy is the principal use of a building or structure, or any portion thereof, for storage that is not classed as a Group H occupancy, including buildings or structures used for the purpose of sheltering animals. For buildings used for the storage of hazardous materials, see 308.

### 312.2 Subclassifications

**312.2.1 S1 Moderate Hazard Storage** shall include buildings used for the storage of combustible materials when not classified as S2 Low Hazard or Group H.

**312.2.2 S2 Low Hazard Storage** shall include buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons without significant amounts of combustible wrappings. Such products may have a negligible amount of plastic trim such as knobs, handles, or film wrapping. S2 Low Hazard Storage shall include but not be limited to the following:

- Beer or wine up to 12% alcohol in metal, glass or ceramic containers
- Cement in bags



### 312.2.3

- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Dry insecticides
- Electrical motors
- Electric coils
- Empty cans
- Electrical insulators
- Fresh fruit and vegetables in nonplastic trays or containers
- Frozen foods
- Foods in noncombustible containers
- Glass bottles, empty or filled with noncombustible liquids
- Gypsum board
- Inert Pigments
- Meats
- Metal cabinets
- Metal desks with plastic tops and trim
- Metal parts
- Mirrors
- Oil filled and other types of distribution transformers
- Washer and dryers
- Stoves

**312.2.3** Portions of Group S occupancy involving highly combustible, flammable or explosive products or materials shall be properly ventilated, protected and separated from the remainder of the building in accordance with the appropriate NFPA Standard or the entire building will be classified as Group H occupancy.



## CHAPTER 5 GENERAL BUILDING LIMITATIONS

### SECTION 501 GENERAL

**501.1 Scope.** Provisions of this chapter shall govern the height and area of buildings.

### SECTION 502 DEFINITIONS

For definitions, see Chapter 2.

### SECTION 503 HEIGHT AND AREA

#### 503.1 Application

**503.1.1** For the purpose of this code, "height" and "area," as applied to a building, has the meaning designated in Chapter 2.

**503.1.2** The height and area for buildings or structures of the different types of construction shall be governed by the intended occupancy or use of the building, as provided for in this chapter and shall not exceed the limits set forth in Table 500 except as modified in 503.2 and 503.3 and the specific use provisions of this chapter. For the purpose of this code, each part of a building or structure included within fire walls shall be considered a separate building.

**Exception:** A building permitted to be unlimited in area by 503.4.1 shall be permitted to have interior fire walls.

**503.1.3** A building heretofore erected shall not be extended to exceed the allowable floor area set forth in this chapter, governed by the occupancy and type of construction. A building heretofore lawfully erected, which exceeds such area, may be extended horizontally, provided such extension does not exceed the area prescribed and provided such extension is separated from the existing building by a fire wall as set forth in 503.1.2.

#### 503.2 Height modifications

**503.2.1 Rooftop structures.** Church spires, chimneys, tanks and supports, aerial supports, parapet walls not over 4 ft (1219 mm) high, bulkheads and penthouses used solely to enclose stairways, tanks, elevator machinery or shafts, or ventilation or air conditioning apparatus, need not be considered in determining the highest point of the building, provided that the highest point shall be taken to be the highest point of the roof of the highest penthouse when the aggregate area of all penthouses and other roof structures exceeds one-third of the area of the roof upon which they stand. See 1517.

**503.2.2 Parking under Group R.** Where a one-story automobile parking garage, enclosed or open of Type I or II construction, or open of Type III construction, with grade entrance, is provided under a building of Group R occupancy, the number of stories to be used in determining the minimum type of construction may be measured from the floor above such parking area. The floor/ceiling assembly between the parking garage and the Group R occupancy above shall comply with the type of construction required for the parking garage and shall also provide a fire resistance rating not less than the occupancy separation required in 704.1.1.

**503.2.3 Mezzanines.** A mezzanine shall not be counted as a story when it meets the following requirements:

**503.2.3.1** The construction of a mezzanine shall be consistent with the type of materials and fire resistance ratings required for the building in which it is constructed.

**503.2.3.2** The total area of mezzanines within a room shall not exceed one-third that of the room or space in which they are located. Enclosed space under a mezzanine shall not be included in a determination of the size of the room or space in which the mezzanine is located.

**503.2.3.3** All portions of a mezzanine shall be open and unobstructed to the room in which it is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

#### Exceptions:

1. Mezzanines or portions thereof need not be open to the room in which they are located, provided the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. In sprinklered buildings, a mezzanine having two or more means of egress need not open into the room in which it is located, if at least one of the means of egress provides direct access to an exit at the mezzanine level.

**503.2.3.4** Means of egress shall be in accordance with 1005.7.

**503.2.4 Basements.** A basement of a building shall not count as a story, when applying Table 500 for allowable building height, if the upper surface of the first floor above such basement complies with all of the following:

1. is less than 7 ft (2134 mm) above grade,

2. is less than 7 ft (2134 mm) above finished ground level for more than 50 percent of the perimeter of a building, and
3. is less than 12 ft (3658 mm) above finished ground level around the entire building perimeter.

A basement is counted as a story when applying other sections of the code.

**503.2.5 Group A and E basements.** Group A and Group E basements used as classrooms or assembly rooms shall be counted as a story.

### 503.2.6 Special unlimited height

**503.2.6.1** The height of Group B, Group M and Group R occupancies of Type II construction shall not be limited, provided the fire resistance of all columns shall be not less than 3 hours and the other structural members including floors shall be not less than that shown in Chapter 6, but in no case less than 2 hours except that roofs and their supporting beams, girders, trusses and arches shall be not less than 1 1/2 hours.

**503.2.6.2** For unlimited height open air grandstands and bleachers, see 403.6.2.1.

### 503.3 General area modifications

**503.3.1** The exceptions and requirements of 503.3 and 503.4 shall modify unsprinklered areas permitted by Table 500 and the specific use provisions of this chapter.

**503.3.2** Where streets or public spaces, or horizontal separation from property lines of total width of not less than 30 ft (9144 mm), or 30 ft (9144 mm) between buildings on commonly owned property, extend along the building perimeter, except for hazardous occupancies, the areas permitted by Table 500 may be increased as follows:

$$I = 4/3[100 (F/P - 0.25)]$$

Where

I = Percent increase of unsprinklered areas in Table 500

F = Building perimeter which fronts on streets, public spaces or horizontal separation not less than 30 ft (9144 mm) wide

P = Total perimeter of building

**503.3.3** For both an unsprinklered building and a sprinklered building, the percent increase is multiplied by the unsprinklered area permitted in Table 500 for the type of construction of the building, and the resulting area increase is added to either the sprinklered or unsprinklered areas in Table 500. When there are no unsprinklered areas permitted for the building in Table 500, an unsprinklered area can be computed for use in this section. The corresponding unsprinklered areas are computed as one-third of the sprinklered area for one story only and as one-half of the sprinklered area for multistories.

### 503.4 Occupancy area modifications

**503.4.1** The area of a one story building of Group B, Group F, Group M, or Group S occupancy shall not be limited provided the building is equipped with an approved automatic sprinkler system throughout, in accordance with 903, or other automatic extinguishing systems as approved by the building official, and is surrounded on all sides by a permanent open space of not less than 60 ft (18 m). High-piled combustible storage shall be protected in accordance with Chapter 36 of the Standard Fire Prevention Code.

#### Exceptions:

1. Where water may cause or increase a fire, other fire extinguishing systems shall be required in rooms or buildings used for the manufacture or storage of hazardous materials including but not limited to, aluminum powder, calcium carbide, metallic sodium and potassium, quicklime, magnesium powder and sodium peroxide.
2. In Group F and Group S occupancies where non-combustible products are manufactured or stored, such as metal processing and manufacturing plants, and metal products are not stored in combustible wrappings, containers or palletized, the sprinkler system may be omitted upon approval of the building official.

**503.4.2** The area of a one-story building of Type IV construction used for Group E occupancy shall not be limited provided the building is equipped throughout with an approved automatic sprinkler system in accordance with 903, is surrounded on all sides by a permanent open space of not less than 60 ft (18.3 m), and is provided with 1-hour fire resistant smokestop partitions dividing the building into areas not to exceed 30,000 sq ft (2787 m<sup>2</sup>) in floor area.

**503.4.3** One-story Group A buildings without a stage requiring proscenium opening protection of Type V 1-hour, IV or III construction which are surrounded on all sides by a permanent open space of not less than 60 ft (18.2 m), are provided with an approved automatic sprinkler system, and the assembly floor is located at, or within 21 inches (533 mm) of street or grade level and all exits meet the street or grade level by ramps having a slope not exceeding 1:10 shall not be limited in area.

**503.4.4** Where there are no balconies or galleries in Group A - Large Assemblies without a stage requiring proscenium opening protection or in Group A - Small Assembly with or without a stage requiring proscenium opening protection, and the assembly floor is located at or within 21 inches (533 mm) of street or grade level and all exits meet the street or grade level by ramps having a slope not exceeding 1:10, the maximum allowable areas of Type III, IV and V construction may be increased 50% over the unsprinklered areas specified in Table 500. This increase may be added to the area increase permitted by 503.3.2.

**503.4.5** One-story buildings used for participation sports such as tennis, skating and similar activities, limited in occupant content to those participating in the sports activity, and with no spectator seating permitted, may be unlimited in area when of Types III, IV and V construction and are surrounded on all sides by not less than 30 ft (9144 mm) of permanent open space.

**503.4.6** When used as a place of worship, the allowable areas for Group A - Small Assembly without a stage requiring proscenium opening protection may be increased 33 1/3% over the unsprinklered areas specified in Table 500. This increase may be added to the area increase permitted by 503.3.2.

**503.4.7** The area of a one story Group E Type III, IV or V building may be increased 100% over the unsprinklered areas specified in Table 500 if the building is surrounded on all sides by a permanent open space of not less than 60 ft (18.3 m), and there are not less than two exits provided from each classroom, one of which opens directly to the exterior of the building. This increase may be added to the area increase permitted by 503.3.2.

**503.4.8** The permanent open space of 60 ft (18.3 m) required in 503.4.1, 503.4.2, 503.4.3 and 503.4.7 shall be permitted to be reduced to not less than 40 ft (12.2 m) provided all of the following requirements are met:

1. The reduced open space shall not be allowed for more than 75% of the perimeter of the building.
2. The exterior wall facing the reduced open space shall have minimum fire resistance rating of 3 hours.
3. All openings in the exterior wall, facing the reduced open space, shall have opening protectives with a fire resistance rating of 3 hours.

**503.4.9** Group A area modification: Open air grandstands and bleachers, see 403.6.2.1.

**503.4.10** Group M area modifications: covered mall buildings see 413.6.

**503.4.11** Group S area modifications:

1. Aircraft hangars see 411.7.2.
2. Automobile parking garages see 411.3.

## **SECTION 504**

### **BUILDINGS LOCATED ON THE SAME LOT**

Where the exterior walls of two or more buildings located on the same lot face one another, and one of the walls is not constructed as required for a fire wall, a property line shall be assumed between them. The fire resistance requirements for such facing walls and for the protection of openings therein shall be the same as required by this code for walls and openings facing an assumed property line, as provided in Table 600.

**Exception:** Fire resistance separation shall not be required between a dwelling and its detached private garage.

## **SECTION 505**

### **BUILDINGS LOCATED WITHIN A FIRE DISTRICT**

Additional provisions for buildings located within a fire district are contained in Appendix F. Those provisions are applicable only where specifically included in the adopting ordinance.

TABLE 500

TABLE 500  
ALLOWABLE HEIGHTS AND BUILDING AREAS

Lower case letters in table refer to Notes following table.

Height for types of construction is limited to the number of stories and height in feet shown.

Allowable building area (determined by definition of "Area, Building") is shown in thousands of square feet per floor.

TYPE CONSTRUCTION	I		II		III		IV 1-HOUR		IV UNPROT.		V 1-HOUR		V UNPROT.		VI 1-HOUR		VI UNPROT.	
Maximum Height In Feet:	NL		80'		65'		65'		55'		65'		55'		50'		40'	
OCCUPANCY	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr
	j		h	j	h	j	h	j	h	j	h	j	h	j	h	j	h	j
A-1 ASSEMBLY LARGE (stage requiring proscenium opening protection) a,b																		
Max. No. of stories	NL	NL	NL	NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area: Multistory	UA	UA	UA	UA														
One Story only	UA	UA	UA	UA														
A-1 ASSEMBLY LARGE (no stage requiring proscenium opening protection) a, b																		
Max. No. of Stories	NL	NL	NL	NL	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Area: Multistory	UA	UA	UA	UA														
One Story only	UA	UA	UA	UA	12.0	36.0	12.0	36.0	8.0	24.0	12.0	36.0	8.0	24.0				
A-2 ASSEMBLY SMALL (stage requiring proscenium opening protection) a,b																		
Max. No. of Stories	NL	NL	NL	NL	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Area: Multistory	UA	UA	UA	UA														
One Story only	UA	UA	UA	UA	10.0	30.0	10.0	30.0	6.0	18.0	10.0	30.0	6.0	18.0	4.5	13.5	3.0	9.0
A-2 ASSEMBLY SMALL (no stage requiring proscenium opening protection) a, b																		
Max. No. of Stories	NL	NL	NL	NL	2	2	2	2	2	2	2	2	2	2	1	1	1	1
Area: Multistory	UA	UA	UA	UA	12.0	24.0	12.0	24.0	8.0	16.0	12.0	24.0	8.0	16.0				
One Story only	UA	UA	UA	UA	12.0	36.0	12.0	36.0	8.0	24.0	12.0	36.0	8.0	24.0	7.5	22.5	5.0	15.0
B BUSINESS a,b																		
Max. No. of Stories	NL	NL	NL	NL	5	5	5	5	2	5	5	5	2	5	2	2	2	2
Area: Multistory	UA	UA	UA	UA	25.5	51.0	25.5	51.0	17.0	34.0	21.0	42.0	14.0	28.0	13.5	27.0	9.0	18.0
One Story only	UA	UA	UA	UA	25.5	76.5	25.5	76.5	17.0	51.0	21.0	63.0	14.0	42.0	13.5	40.5	9.0	27.0
E EDUCATIONAL a, b																		
Max. No. of stories	NL	NL	NL	NL	2	2	2	2	1	1	2	2	1	1	2	2	1	1
Area: Multistory	UA	UA	UA	UA	18.0	36.0	18.0	36.0			18.0	36.0			12.0	24.0		
One Story only	UA	UA	UA	UA	18.0	54.0	18.0	54.0	12.0	36.0	18.0	54.0	12.0	36.0	12.0	36.0	8.0	24.0
F FACTORY-INDUSTRIAL a,b,g																		
Max. No. of Stories	NL	NL	NL	NL	3	6	2	4	2	4	2	4	2	4	1	1	1	1
Area: Multistory	UA	UA	UA	UA	31.5	63.0	31.5	63.0	21.0	42.0	22.5	45.0	15.0	30.0				
One Story only	UA	UA	UA	UA	31.5	94.5	31.5	94.5	21.0	63.0	22.5	67.5	15.0	45.0	15.0	45.0	10.0	30.0
H-1 HAZARDOUS c																		
Max. No. of Stories	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0
Area: Multistory																		
One Story only		15.0		12.0		7.5		7.5		5.0		7.5						
H-2 HAZARDOUS c																		
Max. No. of Stories	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0
Area: Multistory																		
One Story only		15.0		12.0		7.5		7.5		5.0		7.5		4.0		2.5		
H-3 HAZARDOUS c																		
Max. No. of Stories	0	4	0	3	0	2	0	2	0	1	0	2	0	1	0	1	0	0
Area: Multistory		30.0		20.0		10.0		10.0				10.0						
One Story only		30.0		20.0		10.0		10.0		7.5		10.0		7.5		4.0		
H-4 HAZARDOUS c																		
Max. No. of Stories	0	NL	0	6	0	3	0	4	0	4	0	4	0	4	0	1	0	1
Area: Multistory		UA		UA		48.0		48.0		32.0		48.0		32.0				
One Story only		UA		UA		72.0		72.0		48.0		72.0		48.0		27.0		18.0

NL = No Limit

UA = Unlimited Area

(continued)

TABLE 500 (continued)

TABLE 500 (continued)  
ALLOWABLE HEIGHTS AND BUILDING AREAS

Lower case letters in table refer to Notes following table.

Height for types of construction is limited to the number of stories and height in feet shown.

Allowable building area (determined by definition of "Area, Building") is shown in thousands of square feet per floor.

TYPE CONSTRUCTION	I		II		III		IV 1-HOUR		IV UNPROT.		V 1-HOUR		V UNPROT.		VI 1-HOUR		VI UNPROT.	
Maximum Height In Feet:	NL		80'		65'		65'		55'		65'		55'		50'		40'	
OCCUPANCY	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr	uns	spr
	j	j	h	j	h	j	h	j	h	j	h	j	h	j	h	j	h	j
I INSTITUTIONAL-- RESTRAINED b																		
Max. No. of stories	NL	NL	NL	NL	0	2	i	3	0	2	0	3	0	2	0	3	0	2
Area: Multistory	UA	UA	UA	UA		24.0	15.0	30.0		20.0		21.0		14.0		15.0		10.0
One Story only	UA	UA	UA	UA		36.0	15.0	45.0		30.0		31.5		21.0		22.5		15.0
I INSTITUTIONAL-- UNRESTRAINED b																		
Max. No. of Stories	0	NL	0	NL	0	2	0	3	0	1	0	i	0	0	0	1	0	0
Area: Multistory		UA		UA		24.0		30.0										
One Story only		UA		UA		36.0		45.0		30.0		31.5				22.5		
M MERCANTILE a,b	f		f		f		f		f		f		f		f		f	
Max. No. of Stories	NL	NL	NL	NL	5	5	5	5	2	5	5	5	2	5	2	2	2	2
Area: Multistory	15.0	UA	15.0	UA	13.5	27.0	13.5	27.0	9.0	18.0	13.5	27.0	9.0	18.0	9.0	18.0	6.0	12.0
One Story only	15.0	UA	15.0	UA	13.5	40.5	13.5	40.5	9.0	27.0	13.5	40.5	9.0	27.0	9.0	27.0	6.0	18.0
R RESIDENTIAL a,b,d																		
Max. No. of Stories	NL	NL	NL	NL	3	3	5	5	2	5	5	5	2	5	3	3	2	2
Area: Multistory	UA	UA	UA	UA	18.0	36.0	18.0	36.0	12.0	24.0	18.0	36.0	12.0	24.0	10.5	21.0	7.0	14.0
One Story only	UA	UA	UA	UA	18.0	54.0	18.0	54.0	12.0	36.0	18.0	54.0	12.0	36.0	10.5	31.5	7.0	21.0
S STORAGE a,b,e,g																		
Max. No. of Stories	NL	NL	6	6	2	6	2	4	2	4	2	4	2	4	1	1	1	1
Area: Multistory	UA	UA	30.0	60.0	24.0	48.0	24.0	48.0	16.0	32.0	24.0	48.0	16.0	32.0				
One Story only	UA	UA	30.0	90.0	24.0	72.0	24.0	72.0	16.0	48.0	24.0	72.0	16.0	48.0	9.0	27.0	6.0	18.0

For SI: 1 ft = 0.305 m, 1 sq ft = 0.0929 m<sup>2</sup>.

NL = No Limit

UA = Unlimited Area

## Notes:

- a. For height modifications and limitations by occupancy, see:
  1. Mezzanines ..... 503.2.3
  2. Basements ..... 503.2.4
  3. Assembly Basements ..... 503.2.5
  4. Business ..... 503.2.6
  5. Educational Basements ..... 503.2.5
  6. Mercantile ..... 503.2.6
  7. Residential ..... 503.2.2, 503.2.6
- b. For area modifications and limitations by occupancy see:
  1. Area increase for separation (All occupancies except H) ..... 503.3.2
  2. Assembly ..... 503.4.3, 503.4.4, 503.4.5, 503.4.6, 503.4.8
  3. Business ..... 503.4.1, 503.4.8
  4. Educational ..... 503.4.2, 503.4.7
  5. Factory-Industrial ..... 503.4.1, 503.4.8
  6. Mercantile ..... 503.4.1, 503.4.8, 503.4.10
  7. Storage ..... 503.4.1, 503.4.8, 503.4.11
- c. Modifications in height and area shall not be permitted in Group H occupancies.
- d. See 903.7.5 and 903.7.6 for height limitations of unsprinklered R1 and R2 occupancies. Height and area increases in 503 are not permitted for NFPA 13D and NFPA 13R sprinkler systems installed in accordance with 903.7.7 or as an option in 903.7.6.
- e. See 411.3.1 for allowable height and floor areas of Open Automobile Parking Structures.
- f. Total area for unsprinklered Group M occupancies after increase permitted by 503.3 shall not exceed 15,000 sq ft.
- g. Height in feet not applicable to Group S and Group F occupancies.
- h. When all portions of buildings are sprinklered in accordance with the standards listed in 903.2, the height of buildings listed under this column may be increased one story. A general area increase provided for in 503.3.2 may be applied before using footnote h.
- i. Automatic sprinkler protection required throughout all buildings where Use Condition 5 is used. See 409.2.3. and 1024.2.2.
- j. When all portions of buildings are sprinklered in accordance with the standards listed in 903.2, the allowable heights and areas of buildings shall be as listed under this column.





## CHAPTER 6 CONSTRUCTION TYPES

### SECTION 601 GENERAL

**601.1 Scope.** Provisions of this chapter shall govern the classification of construction type by materials and fire resistance of its elements and the use of more than one construction type in a building.

#### 601.2 Classification by type of construction

**601.2.1** Every building shall be classified by the building official into one of the types of construction as set forth in this section.

Type I	Type V
Type II	1-Hour Protected
Type III	Unprotected
Type IV	Type VI
1-Hour Protected	1-Hour Protected
Unprotected	Unprotected

**601.2.2** Materials for any one of the six types of construction may be used as specified in Table 600, or as permitted in this chapter.

#### 601.3 Fire resistance requirements

**601.3.1** All fire resistance requirements are expressed in terms of the number of hours of satisfactory performance in accordance with ASTM E 119.

**601.3.2** Construction required to have a fire resistance rating shall be supported by construction of equal or greater fire resistance.

**Exception:** In Types IV Unprotected, V Unprotected and VI Unprotected construction, structural elements supporting exit access corridor walls and tenant separation walls of not more than 1-hour fire resistance need not be rated provided a fire resistance rating is not required by other provisions of this code.

#### 601.4 Materials and construction approved for fire resistance

**601.4.1** The degree of fire resistance and the materials, assemblies, and constructions providing such resistance shall be defined in Chapter 7 of this code, except that other materials, assemblies, and constructions shall be approved, provided test data of a recognized engineering or testing laboratory are submitted, establishing that they develop the required fire resistance rating under tests made in accordance with ASTM E 119 or based on calculations and accepted engineering practice as set forth in 709.

**601.4.2** Where structural requirements necessitate assemblies providing greater fire resistance than specified in this chapter, such structural requirements shall govern.

### SECTION 602 DEFINITIONS

For definitions, see Chapter 2.

### SECTION 603 TYPE I CONSTRUCTION

Type I is construction in which the structural members including exterior walls, interior bearing walls, columns, beams, girders, trusses, arches, floors, and roofs are of non-combustible materials and are protected so as to have fire resistance not less than that specified for the structural elements as specified in Table 600. For interior nonbearing partition requirements, see 704.2. For provisions governing combustibles in concealed spaces, see 707.

### SECTION 604 TYPE II CONSTRUCTION

Type II is construction in which the structural members including exterior walls, interior bearing walls, columns, beams, girders, trusses, arches, floors and roofs are of non-combustible materials and are protected so as to have fire resistance not less than that specified for the structural elements as specified in Table 600. For interior nonbearing partition requirements see 704.2. For provisions governing combustibles in concealed spaces, see 707.

### SECTION 605 TYPE III CONSTRUCTION

**605.1 General.** Type III is construction in which fire resistance is attained by the sizes of heavy timber members (sawn or glued laminated) being not less than indicated in this section, or by providing fire resistance not less than 1 hour where materials other than wood of heavy timber sizes are used; by the avoidance of concealed spaces under floors and roofs; by the use of approved fastenings, construction details and adhesives for structural members; and by providing the required degree of fire resistance in exterior and interior walls.

#### 605.2 Columns

**605.2.1** Wood columns may be sawn or glued laminated and shall be not less than 8 inches nominal in any dimension when supporting floor loads, and not less than 6 inches nominal wide and 8 inches nominal deep when supporting roof and ceiling loads only.

**605.2.2** Columns shall be continuous or superimposed throughout all stories 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.

### 605.3 Floor framing

**605.3.1** Beams and girders of wood may be sawn or glued laminated and shall be not less than 6 inches nominal wide and not less than 10 inches nominal deep.

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

**605.3.3** Framed timber trusses supporting floor loads shall have members of not less than 8 inches nominal in any dimension.

### 605.4 Roof framing

**605.4.1** Framed or glued laminated arches for roof construction which spring from the floor line and do not support floor loads shall have members not less than 6 inches nominal wide and 8 inches nominal deep for the lower of the height and not less than 6 inches nominal in any dimension for the upper half of the height.

**605.4.2** Framed or glued laminated arches for roof construction which 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 nominal wide and not less than 6 inches nominal deep. Spaced members may be composed of two or more pieces not less than 3 inches nominal thick 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 inches nominal thick, secured to the underside of the members. Splice plates shall be no less than 3 inches nominal thick. When protected by approved automatic sprinklers under the roof deck, such framing members shall be not less than 3 inches nominal wide.

### 605.5 Construction details

**605.5.1** Wall plate boxes of self-releasing type, or approved hangers, shall be provided where beams and girders enter masonry. An air space of 1/2 inch (12.7 mm) shall be provided at the top, ends and sides of the member unless approved naturally durable or preservative-treated wood is used.

**605.5.2** 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.

**605.5.3** Where intermediate beams are used to support floors, they shall rest on top of the girders, or shall be sup-

ported by ledgers or blocks securely fastened to the sides of the girders, or they may be supported by approved metal hangers into which the ends of the beams shall be fitted closely.

**605.5.4** Columns, beams, girders, arches and trusses of material other than wood shall have a fire resistance rating of not less than 1 hour.

**605.5.5** Wood beams and girders supported by walls required to have a fire resistance rating of 2 hours or more shall have not less than 4 inches (102 mm) of solid masonry between their ends and the outside face of the wall, and between adjacent beams.

**605.5.6** Adequate roof anchorage shall be provided.

**605.6 Floor decks.** Floors shall be without concealed spaces. They shall be of sawn or glued laminated plank, splined, or tongue-and-grooved, not less than 3 inches nominal thick, or of planks not less than 4 inches nominal wide set on edge and well-spiked together. The planks shall be laid so that no continuous line of joints will occur except at points of support and they shall not be spiked to supporting girders. Planks shall be covered with 1 inch nominal tongue-and-groove flooring laid crosswise or diagonally or with 15/32 inch (11.9 mm) wood structural panels. Planks and flooring shall not extend closer than 1/2 inch (12.7 mm) to walls to provide an expansion joint, and the joint shall be covered at top or bottom.

**605.7 Roof decks.** Roofs shall be without concealed spaces and roof decks shall be sawn or glued laminated, splined or tongue and grooved plank, not less than 2 inches nominal thick, or of planks not less than 3 inches nominal wide, set on edge and spiked together as required for floors, or of 1 1/8-inch (29 mm) tongue and grooved wood structural panels bonded with exterior glue. Other types of decking may be used when approved by the building official.

### 605.8 Walls

**605.8.1** Bearing portions of exterior and interior walls shall be of approved noncombustible materials and shall provide fire resistance ratings in accordance with Table 600.

**605.8.2** Nonbearing portions of exterior walls shall be of approved noncombustible materials and shall provide fire resistance ratings in accordance with Table 600.

**Exception:** Where a horizontal separation of at least 20 ft (6096 mm) is provided, wood columns, arches, beams and roof decks conforming to heavy timber sizes may be used externally.

## SECTION 606 TYPE IV CONSTRUCTION

Type IV is construction in which the structural members including exterior walls, interior bearing walls, columns, beams, girders, trusses, arches, floors, and roofs are of non-

combustible materials. Type IV construction may be protected or unprotected. Fire resistance requirements for structural elements of Type IV construction shall be as specified in Table 600. For provisions governing combustibles in concealed spaces, see 707.

## SECTION 607 TYPE V CONSTRUCTION

Type V is construction in which the exterior bearing and non-bearing walls are of noncombustible material and have fire resistance not less than that specified in Table 600; bearing portions of interior walls are of material permitted in Table 600, and have fire resistance not less than that specified in Table 600; and beams, girders, trusses, arches, floors, roofs, and interior framing are wholly or partly of wood or other approved materials and have fire resistance not less than that specified in Table 600. Type V construction may be either protected or unprotected. Fire resistance requirements for structural elements of Type V construction shall be as specified in Table 600.

## SECTION 608 TYPE VI CONSTRUCTION

Type VI is construction in which the exterior bearing and nonbearing walls and partitions, beams, girders, trusses, arches, floors, and roofs and their supports are wholly or partly of wood or other approved materials. Type VI construction may be either protected or unprotected. Fire resistance requirements for structural elements of Type VI construction shall be as specified in Table 600.

## SECTION 609 PARTITIONS

**609.1** Bearing walls shall comply with the provisions of Chapter 6, but shall provide not less than the degree of fire resistance specified in Table 600.

**609.2** Nonbearing partitions shall conform to 609.2.1 through 609.2.4 and have the fire resistance specified in Table 705.1.2 except as specified elsewhere in this code.

**609.2.1 Type I and Type II construction.** Partitions shall be constructed of noncombustible materials.

### Exceptions:

1. Framing members may be of fire retardant treated wood.
2. Pocket doors and their frames may be of wood.

**609.2.2 Type III construction.** Partitions may be of any material permitted by this code.

**609.2.3 Type IV construction.** Partitions shall be constructed of noncombustible materials except that framing members of fire retardant treated wood may be used and pocket doors and their frames may be of wood. Partitions in one story buildings only may be of any material per-

mitted by this code. Partitions in fully sprinklered buildings, regardless of height, may be of any material permitted by this code.

**609.2.4 Type V and Type VI construction.** Partitions may be of any material permitted by this code.

## SECTION 610 MIXED TYPES OF CONSTRUCTION

**610.1 Area limitations.** Where two or more types of construction not separated by fire walls occur in the same building, the area of the entire building shall not exceed the least area permitted based on occupancy for the types of construction used in the building.

**610.2 Height limitations.** Where two or more types of construction occur in the same building, the height of the entire building shall not exceed the least height permitted based on the occupancy for the types of construction used in the building.

**610.3 Open parking structures.** Open parking structures which comply with 411.3 may be constructed beneath other occupancies in buildings of mixed types of construction in accordance with the following:

1. The height and area of the open parking structure shall not exceed that permitted by Table 411.3.1 for the type of construction of the open parking structure.
2. The total height of the structure shall not exceed that allowed for its primary occupancy in accordance with 303 and Table 500.
3. The fire resistance of structural members within the open parking structure that support any part of the building above the open parking structure shall have the same or greater fire resistance as the supported type of construction. This provision applies to all columns; beams, girders, and trusses directly connected to the columns; and all other structural members which directly brace the columns.
4. The entire structure shall be of noncombustible construction.
5. Occupancy separations shall be maintained in accordance with 704.1.
6. All exits for the upper occupancy shall be protected to the exterior of the building in accordance with Chapter 10.

TABLE 600

**TABLE 600**  
**FIRE RESISTANCE RATINGS**  
**REQUIRED FIRE RESISTANCE IN HOURS**

STRUCTURAL ELEMENT	TYPE I	TYPE II	TYPE III	TYPE IV		TYPE V		TYPE VI	
				1-Hour Protected	Unprotected	1-Hour Protected	Unprotected	1-Hour Protected	Unprotected
PARTY AND FIRE WALLS (a)	4	4	4	4	4	4	4	4	4
INTERIOR BEARING WALLS (l)									
Supporting columns, other bearing walls or more than one floor	4	3	2	1	NC	1 (h)	0 (h)	1	0
Supporting one floor only	3	2	1	1	NC	1	0	1	0
Supporting roofs only	3	2	1	1	NC	1	0	1	0
INTERIOR NONBEARING PARTITIONS	See 609.2, 704.1, 704.2 and 705.2								
COLUMNS (q)	(l)		See 605						
Supporting other columns or more than one floor	4	3	H(d)	1	NC	1	0	1	0
Supporting one floor only	3	2	H(d)	1	NC	1	0	1	0
Supporting roofs only	3	2	H(d)	1	NC	1	0	1	0
BEAMS, GIRDERS, TRUSSES & ARCHES (l)			See 605						
Supporting columns or more than one floor	4	3	H(d)	1	NC	1	0	1	0
Supporting one floor only	3	2	H(d)	1	NC	1	0	1	0
Supporting roofs only	1 1/2(e,p)	1(e,f,p)	H(d)	1(e,p)	NC(e)	1	0	1	0
FLOORS & FLOOR/CEILING ASSEMBLIES (l)	3	2	See 605 H (o)	(n) 1	(n,o) NC	(n) 1	(m,n,o) 0	1	(o) 0
ROOFS & ROOF/CEILING ASSEMBLIES (g)	1 1/2(e,p)	1 (e,f,p)	See 605 H(d)	1(e,p)	NC(e)	1	0	1	0
EXTERIOR BEARING WALLS and gable ends of roof (g, i, j)	(% indicates percent of protected and unprotected wall openings permitted. See 705.1.1 for protection requirements.)								
Horizontal separation (distance from common property line or assumed property line).									
0 ft to 3 ft (c)	4(0%)	3(0%)	3(0%)(b)	2(0%)	1(0%)	3(0%)(b)	3(0%)(b)	1(0%)	1(0%)
over 3 ft to 10 ft (c)	4(10%)	3(10%)	2(10%)(b)	1(10%)	1(10%)	2(10%)(b)	2(10%)(b)	1(20%)	0(20%)
over 10 ft to 20 ft (c)	4(20%)	3(20%)	2(20%)(b)	1(20%)	NC(20%)	2(20%)(b)	2(20%)(b)	1(40%)	0(40%)
over 20 ft to 30 ft	4(40%)	3(40%)	1(40%)	1(40%)	NC(40%)	1(40%)	1(40%)	1(60%)	0(60%)
over 30 ft	4(NL)	3(NL)	1(NL)	1(NL)	NC(NL)	1(NL)	1(NL)	1(NL)	0(NL)
EXTERIOR NONBEARING WALLS and gable ends of roof (g, i, j)	(% indicates percent of protected and unprotected wall openings permitted. See 705.1.1 for protection requirements.)								
Horizontal separation (distance from common property line or assumed property line).									
0 ft to 3 ft (c)	3(0%)	3(0%)	3(0%)(b)	2(0%)	1(0%)	3(0%)(b)	3(0%)(b)	1(0%)	1(0%)
over 3 ft to 10 ft (c)	2(10%)	2(10%)	2(10%)(b)	1(10%)	1(10%)	2(10%)(b)	2(10%)(b)	1(20%)	0(20%)
over 10 ft to 20 ft (c)	2(20%)	2(20%)	2(20%)(b)	1(20%)	NC(20%)	2(20%)(b)	2(20%)(b)	1(40%)	0(40%)
over 20 ft to 30 ft	1(40%)	1(40%)	1(40%)	NC(40%)	NC(40%)	1(40%)	1(40%)	0(60%)	0(60%)
over 30 ft (k)	NC (NL)	NC(NL)	NC(NL)	NC(NL)	NC(NL)	NC(NL)	NC(NL)	0(NL)	0(NL)

For SI: 1 ft = 0.305 m.

NC = Noncombustible  
 NL = No Limits  
 H = Heavy Timber Sizes

## Notes:

- a. See 704.5 for extension of party walls and fire walls.
- b. See 704.5 for parapets.
- c. See 705 for protection of wall openings.
- d. Where horizontal separation of 20 ft or more is provided, wood columns, arches, beams, and roof deck conforming to heavy timber sizes may be used externally.
- e. In buildings not over two stories approved fire retardant treated wood may be used.
- f. In one-story buildings, structural members of heavy timber sizes may be used as an alternate to unprotected structural roof members. Stadiums, field houses and arenas with heavy timber wood dome roofs are permitted. An approved automatic sprinkler system shall be installed in those areas where 20 ft clearance to the floor or balcony below is not provided.
- g. See 1517 for penthouses and roof structures.
- h. The use of combustible construction for interior bearing partitions shall be limited to the support of not more than two floors and a roof.
- i. Exterior walls shall be fire tested in accordance with 601.3. The fire resistance requirements for exterior walls with 5 ft or less horizontal separation shall be based upon both interior and exterior fire exposure. The fire resistance requirements for exterior walls with more than 5 ft horizontal separation shall be based upon interior fire exposure only.
- j. Where Appendix F is specifically included in the adopting ordinance, see F102.2.6 for fire resistance requirements for exterior walls of Type IV buildings in Fire District.
- k. Walls or panels shall be of noncombustible material or fire retardant treated wood, except for Type VI construction.
- l. For Group A - Large Assembly, Group A - Small Assembly, Group B, Group E, Group F, Group R occupancies and Automobile Parking Structures, occupancies of Type I construction, partitions, columns, trusses, girders, beams, and floors may be reduced by 1 hour if the building is equipped with an automatic sprinkler system throughout, but no component or assembly may be less than 1 hour.
- m. Group A - Large Assembly (no stage requiring proscenium opening protection) and Group A - Small Assembly occupancies of Type V Unprotected construction shall have 1-hour fire resistant floors over any crawl space or basement.
- n. For Group B and Group M occupancies of Type IV or Type V construction, when five or more stories in height a 2-hour fire resistant floor shall be required over the basement.
- o. For unsprinklered Group E occupancies of Type III, Type IV Unprotected, Type V Unprotected or Type VI Unprotected, floors located immediately above useable space in basements shall have a fire resistant rating of not less than 1 hour.
- p. In buildings of Group A, B, E, and R occupancies, the required fire resistance of the roof or roof/ceiling assembly including the beams, girders, trusses, or arches that support the roof only may be omitted where every part of the roof structural members have a clear height of 20 ft (6096 mm) or more above any floor, mezzanine or balcony.
- q. See 701.4.



## CHAPTER 9 FIRE PROTECTION SYSTEMS

### SECTION 901 GENERAL

**901.1 Scope.** Provisions of this chapter shall govern the application, design, installation, testing and maintenance of automatic sprinklers, standpipes and fire alarms.

### SECTION 902 DEFINITIONS

For definitions, see Chapter 2.

### SECTION 903 SPRINKLERS

**903.1 Approved equipment and layout.** Only approved sprinklers and devices shall be used in automatic sprinkler systems and the complete layout of the system shall be submitted to the building official for approval before installation.

**903.2 Requirements.** Every automatic sprinkler system required by this code shall conform to NFPA 13, as modified by NFPA 231 and NFPA 231C, except that a single water supply of adequate pressure, capacity and reliability, equal to the primary supply required by those standards, may be permitted by the building official. Automatic sprinkler systems installed in lieu of or as an alternate to other requirements, as permitted by this code, shall be considered required systems and shall comply with NFPA 13.

**903.3 Material.** Piping shall be as specified in NFPA 13.

**903.4 Hose threads.** All hose threads in connections shall be uniform with that used by the fire department of the applicable governing body.

**903.5 General.** Approved automatic sprinkler equipment meeting the requirements of 903 shall be installed in buildings as follows:

1. Basements having floor areas exceeding 2,500 sq ft (232 m<sup>2</sup>) when used as workshops or for manufacture, repair, sale or storage of combustible materials or when used as lounges or nightclubs regardless of the size. See 503.4.1, Exception 2.
2. In buildings which do not have suitable access, as set forth in 1405, to each story above grade on at least one accessible side of the building. Openings which are glazed with security glazing designed to withstand breakage shall not be considered as access openings.
3. See Chapter 36, Standard Fire Prevention Code.
4. See 407.1.3, 411.7.6 and 411.7.7.
5. Spray finishing booth, area or room shall comply with Chapter 10 of the Standard Fire Prevention Code.

**903.6 Garages.** Approved automatic sprinkler systems shall be provided in the following garages:

1. Enclosed parking garages over 65 ft (19.8 m) high and exceeding 10,000 sq ft (929 m<sup>2</sup>) per floor.
2. Repair garages two stories or more high, and exceeding 10,000 sq ft (929 m<sup>2</sup>) in a single floor area.
3. One story repair garages exceeding 15,000 sq ft (1394 m<sup>2</sup>).
4. Basement garages or repair garages in a basement.

**Exception:** Group R3 occupancies.

5. Garages used for the storage of commercial trucks and having an area exceeding 5,000 sq ft (465 m<sup>2</sup>).
6. Bus garages when used as passenger terminals for four or more buses or when used for bus storage or loading of four or more buses.

### 903.7 Other occupancy sprinkler requirements

**903.7.1 Group M.** An approved automatic sprinkler system shall be provided in stores and similar occupancies where stocks of combustible materials are on display for public sale and where the story floor area exceeds 15,000 sq ft (1394 m<sup>2</sup>).

### 903.7.2 Group A

**903.7.2.1** An approved automatic sprinkler system shall be provided in Group A-1 occupancies over areas which could be used for the display, sale or storage of combustible materials when such display, sale or storage floor area exceeds 15,000 sq ft (1394 m<sup>2</sup>).

**903.7.2.2** Stages shall be provided with an approved automatic sprinkler system. Such sprinklers shall be provided throughout the stage and in dressing rooms, workshops, storerooms, and other accessory spaces contiguous to such stages.

### Exceptions:

1. Sprinklers are not required where stages are 1,000 sq ft (93 m<sup>2</sup>) or less in area and 50 ft (15.2 m) or less in height and curtains, scenery, or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs, and a single backdrop.
2. Sprinklers are not required under stage areas less than 4 ft (1219 mm) in clear height used exclusively for chair or table storage and lined on the inside with 5/8 inch (15.9 mm) Type X gypsum wallboard or approved equal.

**903.7.2.3** Buildings or portions thereof used for the specific purpose of sound stages for motion picture or television productions and greater than 1,000 sq ft (93 m<sup>2</sup>) shall be protected with an approved automatic sprinkler system.

**903.7.3 High-Piled combustible stock.** An approved automatic sprinkler system shall be provided throughout buildings required to have sprinkler protection by Chapter 36 of the Standard Fire Prevention Code.

**Exception:** Automatic sprinkler systems may be provided only in the storage area of the building when the storage is separated from the remainder of the building by a minimum 2-hour fire resistant separation.

**903.7.4 Hazardous production material (HPM) facility.** An approved automatic sprinkler system shall be provided throughout buildings containing Group H (HPM) facilities as defined in 408, shall be designed in accordance with NFPA 13 and not less than that required for the special fire hazard areas shown in Table 903.7.4.

**TABLE 903.7.4  
HAZARDOUS PRODUCTION MATERIAL FACILITIES  
SPECIAL FIRE HAZARD AREA REQUIREMENTS**

LOCATION	NFPA HAZARD GROUP
Fabrication Areas	Ordinary Hazard Group 2
HPM Service Corridors	Ordinary Hazard Group 2
HPM Separate Inside Storage Rooms Without Dispensing	Ordinary Hazard Group 2
HPM Separate Inside Storage Rooms with Dispensing	Extra Hazard Group 2
Exit Access Corridors	Ordinary Hazard Group 2

**903.7.5 Group R1 - Residential Occupancy.** An approved automatic sprinkler system shall be provided throughout Group R1 occupancies three or more stories in height.

**Exception:** An automatic sprinkler system shall not be required when exterior exitway stairs complying with 1006.2 are provided for the guest rooms.

**903.7.6 Group R2 - Residential Occupancy.** An approved automatic sprinkler system shall be provided throughout Group R2 occupancies three or more stories in height.

**Exceptions:**

1. Three-story buildings which are not required to have an automatic sprinkler system by other provisions of the code and provided with exterior exitway stairs complying with 1006.2.

2. An automatic sprinkler system complying with NFPA 13R shall be permitted for buildings not exceeding four stories in height provided the automatic sprinkler system shall not be considered as an alternate to other requirements of the code. See 903.2.

**903.7.7 Group R4 — Residential Care/Assisted Living Occupancies.** An approved automatic sprinkler system shall be provided throughout all Group R4 occupancies in accordance with NFPA 13. Group R4 occupancies shall be protected with quick-response or residential sprinklers.

**Exception:** In Group R4 Small Occupancies an automatic sprinkler system installed in accordance with NFPA 13D or NFPA 13R in accordance with their scopes, shall be permitted provided the automatic sprinkler system shall not be considered an alternate to other requirements of the code.

**903.8 Supervision**

**903.8.1** Where an automatic sprinkler system is provided either as a requirement or as an alternate to another requirement of this code, the system shall be supervised by an approved central, proprietary, auxiliary, or remote station system in accordance with NFPA 72.

**Exception:** Supervisory facilities in accordance with 903.8 shall not be required for extinguishing systems in one and two family dwellings.

**903.8.2** In HPM Facilities, as defined in 408, all valves shall be provided with supervisory tamper switches. In addition to the requirements of 903.8.1, the closing of a valve shall activate an audible and visual signal at the emergency control station.

**903.8.3** When a building fire alarm system is provided, actuation of the sprinkler system shall cause the building alarm to sound.

**SECTION 904  
STANDPIPES**

**904.1 Approval**

**904.1.1** Unless otherwise provided herein, standpipe system design, installation and testing requirements shall comply with NFPA 14.

**904.1.2** The complete layout of the standpipe and hose system shall be submitted to the building official before installation.

**904.2 Where required**

**904.2.1** Standpipes shall be provided in all buildings in which the highest floor is greater than 30 ft (9144 mm) above the lowest level of fire department vehicle access.

**Exception:** Standpipes are not required in Group R3 buildings.



**904.2.2** Standpipes shall be provided in buildings in which the highest floor is 30 ft (9144 mm) or less above the lowest level of fire department vehicle access and exceeding 10,000 sq ft (929 m<sup>2</sup>) in area per story when any portion of the building's interior area is more than 200 ft (61 m) of travel from the nearest point of fire department vehicle access.

**Exceptions:**

1. Standpipes are not required in Group R2 with 8 units or less, R3 and S2 occupancies.
2. Standpipes are not required in buildings protected throughout with automatic sprinklers installed in accordance with NFPA 13.

**904.2.3** Stages greater than 1,000 sq ft (93 m<sup>2</sup>) in area shall be provided with a standpipe on each side of the stage.

**904.2.4** Covered malls shall be provided with standpipe connections in accordance with 413.9.

**904.2.5** Standpipes shall be provided in public assembly halls more than 5,000 sq ft (465 m<sup>2</sup>) in area used for exhibition or display purposes.

**904.2.6** Standpipes shall be provided in nonsprinklered Group A buildings having an occupant load exceeding 1,000 persons.

**904.3 Class and type system**

**904.3.1** Standpipes required by 904.2.1 and 904.2.6 shall be Class I automatic wet standpipes.

**Exception:** Class I automatic and semi-automatic dry standpipes shall be permitted in those buildings where the highest floor surface used for human occupancy is 75 ft (22.9 m) or less above the lowest level of fire department vehicle access.

**904.3.2** Standpipes required by 904.2.3 shall be Class III wet standpipes.

**904.3.3** Standpipes required by 904.2.5 shall be Class II wet standpipes.

**904.3.4** Standpipes required by 904.2.2 shall be Class I dry filled standpipes having a small water supply connection to keep the piping full but requiring water to be pumped into the system for fire fighting purposes or any Class I standpipe permitted by 904.2.

**904.3.5** In buildings requiring standpipes in accordance with 904.2, dry standpipes having no permanent water supply may be installed when in the opinion of the building official and the fire official, a constant and automatic water supply is not necessary.

**904.4 Hose connection location.** Hose connections for standpipes shall be in accordance with NFPA 14.

**904.5 Standpipes during construction.** See 3311.3 for requirements.

**904.6 Supervisory facilities.** Where a building fire alarm system is provided, the closing of any standpipe water supply valve including any valves associated with a fire pump installation shall cause an audible supervisory signal to sound at the fire alarm annunciator or at a constantly attended location. If the building does not have a fire alarm system, locks shall be provided on all valves and shall be of a type acceptable to the building official.

**904.7 Water supply**

**904.7.1** Standpipe piping may be used to supply water for automatic sprinkler systems.

**904.7.2** For nonsprinklered buildings, and sprinklered buildings having floor surfaces used for human occupancy located more than 75 ft (22.9 m) above the lowest level of fire department vehicle access, the water supply shall meet the requirements of NFPA 14.

**904.7.3** For sprinklered buildings having floor surfaces used for human occupancy located 75 ft (22.9 m) or less above the lowest level of fire department vehicle access, required water supply shall meet minimum water pressure requirements of NFPA 13 and shall be:

1. 500 GPM (31.6 L/s) for light hazard occupancy as defined in NFPA 13.
2. 1,000 GPM (63.1 L/s) for ordinary hazard occupancy as defined in NFPA 13.
3. In no case shall the water supply be less than the automatic sprinkler demand including hose stream allowance.

**904.8 Signs.** If control valves are located in a separate room, a sign shall be provided on the entrance door to that room. The lettering shall be at least 4 inches (102 mm) high, of a color contrasting with the background, and shall read STANDPIPE CONTROL VALVE.

**SECTION 905  
FIRE ALARMS**

**905.1 Manual fire alarm systems**

**905.1.1 General.** A fire alarm system in accordance with NFPA 72 shall be installed in all the following occupancies:

- Group A having an occupant load of 1,000 persons or more.
- Group B having an occupant load of 500 or more persons or more than 100 persons above or below the street floor.
- Group E.
- Group F two stories or more in height, and having an occupant load of 500 or more persons above or below the street floor level.
- Group H.
- Group I.

Group M having an occupant load of 500 or more persons or more than 100 persons above or below the street floor level.

Group R.

R1 occupancies having accommodations for more than 15 guests.

R2 Apartment houses four or more stories in height, and dormitories or rooming houses (not transient) having more than 15 sleeping accommodations.

R4 occupancies.

#### Exceptions:

1. Group R1 and R2. Where each guest room in R1 occupancies, dormitories and rooming houses has a direct exit to the outside of the building and the building is three stories or less in height.
2. Groups A, B, E, F, H, M, and R1, R2, R3, and R4 Small Facilities. The manual fire alarm boxes required in 905.1 may be omitted in buildings meeting all of the following requirements:
  1. The building is equipped with an automatic fire detection or automatic sprinkler system covering all areas.
  2. Actuation of the automatic fire detection or automatic sprinkler system will activate the fire alarm system.
  3. Provisions are made to manually activate the fire alarm system at a minimum of one centrally located station.

**905.1.2** Manual fire alarm boxes shall be located not more than 5 ft (1524 mm) from the entrance to each exit.

**905.1.3** Each floor shall be zoned separately. No one zone may exceed 15,000 sq ft (1394 m<sup>2</sup>). A zone indicator panel shall be located at grade level at the normal point of fire department access or at a constantly attended building security control center.

**Exception:** Automatic sprinkler system zones shall not exceed the area permitted by NFPA 13.

**905.1.4** Upon completion of the fire alarm system, all alarm initiating devices and circuits, alarm indicating appliances and circuits, supervisory signal initiating devices and circuits, signaling line circuits, and primary and secondary power supplies shall be subjected to a 100% acceptance test in accordance with NFPA 72.

#### 905.1.5 Alarm indicating appliances

**905.1.5.1 Required.** Alarm indicating appliances listed for the purpose shall be provided.

**905.1.5.2** Visible and audible alarm indicating appliances shall be provided in occupancies housing the hearing impaired. Every required fire alarm system shall include visible alarm indicating appliances in public and common areas.

**905.1.5.3 Activation.** The alarm indicating appliances shall be automatically activated by all of the following where provided:

1. Smoke detectors, other than single-station or multiple-station smoke detectors, as required by 905.2. Activation of the alarm system by smoke detectors shall be by either two cross-zoned smoke detectors within a single protected area or a single smoke detector monitored by an alarm verification zone or an approved equivalent method.
2. Sprinkler water-flow devices;
3. Manual fire alarm boxes; and
4. Other approved types of automatic fire detection device suppression systems.

**905.1.5.4 Audible Alarms.** Audible alarm indicating appliances shall provide a distinctive sound which shall not be used for any purpose other than that of a fire alarm. Such devices shall provide a sound pressure level of 15 dBA above the average ambient sound level in every occupied space within the building. The minimum sound pressure levels shall be: 70 dBA in buildings of Group R occupancy, 90 dBA in mechanical equipment rooms; and 60 dBA in all other occupancy classifications. The maximum sound pressure level for audible alarm indicating appliances shall not exceed 130 dBA at the minimum hearing distance from the audible appliance.

**905.1.5.5 Visible Alarms.** Visible alarm indicating appliances, where required, shall be so located as to notify all occupants in every occupied space within the building.

#### 905.2 Automatic fire detection

**905.2.1** Approved single-station or multiple-station smoke detectors shall be installed in accordance with NFPA 72, Chapter 2, within every dwelling and every dwelling unit within an apartment house, condominium or townhouse, and every guest or sleeping room in a motel, hotel, dormitory, and sleeping rooms in residential care/assisted living occupancies. Where more than one detector is required to be installed within an individual dwelling unit, the detectors shall be wired in such a manner that the actuation of one alarm will actuate all of the alarms in the individual unit.

**905.2.2** In dwellings and dwelling units, a smoke detector shall be mounted on the ceiling or wall at a point centrally located in the corridor or area giving access to each group of rooms used for sleeping purposes. Where the dwelling or dwelling unit contains more than one story, detectors are required on each story including basements, but not including uninhabitable attics, and shall be located in close proximity to the stairway leading to the floor above.

**905.2.3** In dwelling units with split levels and without an intervening door between the adjacent levels, a smoke detector installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

**905.2.4** Smoke detectors connected to a fire alarm system shall be installed in accordance with NFPA 72.

**905.2.5** In dwelling, dwelling units, and sleeping rooms in residential care/assisted living occupancies, smoke detectors shall be hardwired into an AC electrical power source and shall be equipped with a monitored battery backup in all new construction. A monitored battery power source shall be permitted in existing construction.

