

FIRE PROTECTION

2008 NYC BUILDING CODE

ACEC New York & the NYC Department of Buildings
15 June 2009

John Lee, RA NYC Department of Buildings

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2008 Construction Codes signed into law
mandated for new buildings beginning July 1, 2009

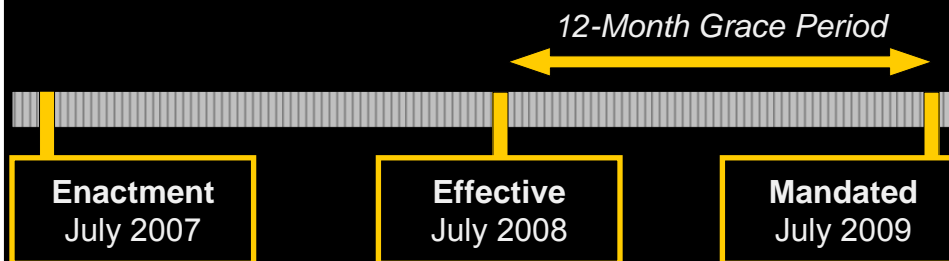


2008 Construction Codes Organization

Administrative Code Title 28	28-100s	Administration
	28-200s	Enforcement
	28-300s	Building Maintenance
	28-400s	Licensing and Registration
	28-500s	Outdoor Signs
	28-600s	Plumbing Code (13 chapters)
	28-700s	Building Code (34 chapters)
	28-800s	Mechanical Code (15 chapters)
	28-900s	Fuel Gas Code (15 chapters)

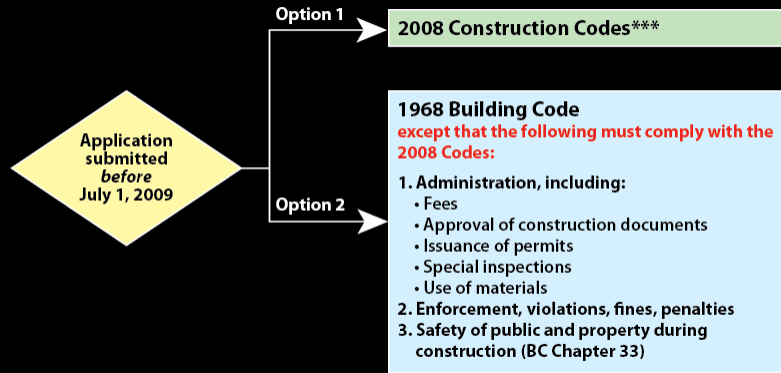
2008 Construction Codes Timeline

For 1 year between the Effective date (08) and the Mandated (09), either the new code or current code may be elected, i.e. 12-month grace period



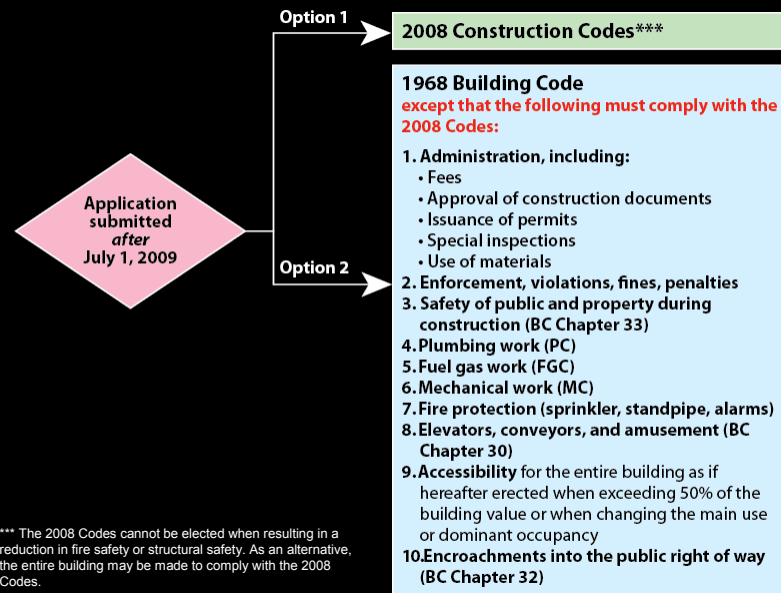
Which code applies?

As of July 1, 2009, all new buildings must comply with the 2008 Codes



*** For alterations, the 2008 Codes cannot be elected when resulting in a reduction in fire safety or structural safety. As an alternative, the entire building may be made to comply with the 2008 Codes.

Which code applies for alterations?



*** The 2008 Codes cannot be elected when resulting in a reduction in fire safety or structural safety. As an alternative, the entire building may be made to comply with the 2008 Codes.

Which code applies for alterations?

As of July 1, 2009, alteration applications may comply with the 1968 Code, except that the following must comply with the 2008 Codes:

- Administration, including fees, approvals, permits, C of Os, inspections, and use of materials
- Enforcement, violations, fines, penalties
- Safety of public and property during construction (Ch. 33)
- Plumbing work (Plumbing Code)
- Fuel gas work (Fuel Gas Code)
- Mechanical work (Mechanical Code)
- **Fire protection (sprinkler, standpipe, alarms) (Ch. 9)**
- Elevators, conveyors, and amusement rides (Ch. 30)
- Accessibility (when exceeding 50% of building value or changing main use)
- Encroachments into the public right of way (Ch. 32)

Reduction in fire/structural safety

§28-101.4.4 Alterations that reduce the fire safety or structural safety of existing buildings.

Notwithstanding any other provision of this code, where the alteration of any existing building in accordance with a provision of this code would result in a reduction of the fire safety or structural safety of such building, relevant provisions of the 1968 building code shall apply to such alteration unless there is full compliance with those provisions of this code that would mitigate or offset such reduction of fire protection or structural safety.

Repealed sections of 1968 Building Code

Excerpts from LL 33/07

§7. Sections 27-118.1, 27-124, 27-125, 27-126, 27-127, 27-128, 27-129, 27-130, 27-131, 27-132, 27-133, 27-134, 27-135, 27-136 and 27-137 of the administrative code of the city of New York are **REPEALED**.

§8. Articles 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 and 27 of subchapter 1 of chapter 1 of title 27 of the administrative code of the city of New York are **REPEALED**.

§9. Subchapter 19 of chapter 1 of title 27 of the administrative code of the city of New York is **REPEALED**.

<p><small>the requirements of seismic evaluation.</small></p> <p>ARTICLE 25 [REPEALED] FIRE PROTECTION PLAN</p> <p>§[C26-124.1] 27-228.1 Applicability. This article shall apply to the following buildings and building sections:</p> <p>(a) High-rise buildings or building sections exceeding seventy-five feet in height.</p> <p>(b) Buildings or building sections classified in occupancy group A, B, C, D, E or G which are two or more stories in height with over twenty thousand gross square feet per floor or are two or more stories in height with a total building floor area exceeding fifty thousand gross square feet.</p> <p>(c) Any building containing an assembly use having an occupant load of three hundred or more persons.</p> <p>(d) Buildings or building sections classified in occupancy group H or J-1 which are two or more stories in height and contain sleeping accommodations for thirty or more persons.</p> <p>(e) Buildings or building sections classified in occupancy group J-2 which contain thirty or more dwelling units and over ten thousand gross square feet of floor area used for mercantile, assembly, educational or institutional purposes.</p> <p>(f) Alterations to a building or building section listed in subdivisions (a) through (e) of this section, if the cost of the alterations, computed in accordance with section 27-110, exceeds one million dollars or involves a change of use.</p> <p>§[C26-124.2] 27-228.2 Scope.</p> <p>(a) The plan shall include the following information, where applicable:</p> <p>(1) Building description: address; block and lot numbers; number of stories; height in feet; occupancy group; construction classification; occupant load and department of buildings application number.</p> <p>(2) Key plans showing all floors, exit, corridors, partitions serving as fire separations or fire divisions, locations and ratings or required enclosures, stairs with pressurization, roof access, exit discharges, locations of firestage egress.</p> <p>(3) Descriptions in narrative form of safety systems and features, including:</p> <p>a. Communications systems</p>	<p>§[C26-124.3] 27-228.3 General Requirements. A fire protection plan as defined in subchapter two shall be filed with the department by a registered architect or licensed professional engineer whose seal and signature shall be on the plan.</p> <p>§[C26-124.4] 27-228.4 Retroactivity. The requirements of this article shall apply to all alterations to, and construction of, buildings listed in section 27-228.1 in progress and not yet completed on March twenty-seventh, nineteen hundred eighty-four.</p> <p>ARTICLE 26 SPECIAL FILING REQUIREMENTS</p> <p>**§[C26-125.1] 27-228.5 General requirements.</p> <p>(a) Owners of all existing buildings which are required to comply with the provisions of subdivision (a) of section 27-353.1 (elevator vestibules), section 27-381 and subdivision (b) of section 27-382 (exit lighting), subdivision (b) of section 27-384 (exit signs), section 27-396.3 (signs in sleeping rooms), section 27-777.2 (ventilation in J-1 buildings), subdivision (b) of section 27-929 (sprinklers, fire alarm systems, fire command and communication systems), paragraph two of subdivision (c) of section 27-989 (elevators in readiness), section 27-996.1 (locks on hoistway doors) and section 27-996.2 (firemen's service) shall file with the department a report on or before April first, nineteen hundred eighty-seven certifying to the installation of the required fire protection systems in accordance with approved plans and appropriate permits prior to such date. Owners of all existing buildings not already subject to the requirements of article nine of subchapter six of this chapter as of January eighth, nineteen hundred seventy-three shall file with the department a report on or before October first, nineteen hundred eighty-five certifying to the installation of stair and elevator signs meeting the requirements of article nine of subchapter six of this chapter prior to such date. Owners of all existing</p>
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- 1968 Building Code
- 2008 Construction Codes
- Recent Code Changes
- NYC Electrical Code
- NYS Energy Code
- Buildings Bulletins, PPNs, Directives, & Memos

NEW NYC CONSTRUCTION CODES

BUILDING CODE REVISIONS

NYC Construction Codes - NYC Construction Codes Text and Updates
Last Updated: May 12, 2009

Below is a chapter-by-chapter outline of the new NYC Construction Codes, with chapter updates made after July 1, 2008 from enacted local laws and administrative corrections. Chapters can be viewed in read-only format online.

The below updates are located beside the Construction Codes chapter it modifies. Please print all updates and insert them into your Construction Codes books. The Department will continue to add updates here. Please visit this site frequently to be sure your Construction Codes books remain updated. Construction Codes books are available at NY [City Store](#).

All these files are in [PDF](#) format.

Administration

Ch #	Subject	Updates
1	Administration	Update 4-14 27/08
		Update 6-11 33/08
		Update 9-14 22/08
		Update 9-14 37/08
		Update 10-11 41/08
		Update 16-11 21/09
2	Enforcement	Update 2-14 24/08
		Update 4-14 32/08
		Update 7-14 34/08
		Update 8-11 37/08
		Update 12-14 46/08
		Update 14-11 06/09
3	Maintenance of Building	Update 8-14 37/08
4	Licensing and Registration of	Update 11-14 44/08
		Update 13-14 14/08

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Filing

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- NYS Energy Code
- Buildings Bulletins, PPNs, Directives, & Memos
- ECB Violation Reference Guides
- MEA Resources
- Reference Standards
- Rules
- Selected Local Laws

REFERENCE MATERIALS

DEPARTMENT RULES

TITLE 1 OF THE RULES OF THE CITY OF NEW YORK
(as of May 20, 2009)

RULES PROPOSED BY THE DEPARTMENT:

Title	RCNY	Status	Public Hearing Information	Effective Date
Waiver of Certain Construction Documents Required to be Submitted by Registered Design Professionals for Certain Work Amendment	§ 101-02	Proposed	5/20/09 1:00PM 6th Fl. Training Rm 280 Bldwy	
Inspections and Approved Agencies Amendment	§ 101-07	Proposed	2/4/09 3:00 PM 3rd Fl. Conf. Rm 280 Bldwy	
Low Pressure boiler inspection and filing requirements, penalties, and waivers	§ 103-01	Proposed	6/18/09 1:00PM 6th Fl. Training Rm 280 Bldwy	
Public Challenge of Department Decisions	§ 105-03	Proposed	3/6/09 3:00 PM 3rd Fl. Conf. Rm 280 Bldwy	
Posting of Permit	§ 105-04	Proposed	3/6/09 3:00 PM 3rd Fl. Conf. Rm 280 Bldwy	
Building Water Conservation Reports, Plans and Waterless Urinals	§ 2000-01	Proposed	5/19/09 9:00AM 6th Fl. Training Rm 280 Bldwy	

PROMULGATED (FINAL) RULES:

Promulgation

Acceptable materials

- All code prescribed products
 - (used without prior approval from the Department, some products have listing/labeling requirements)
- Alternative products
 - (Acceptance Criteria generated by OTCR)
- MEA and BSA products
 - (used without OTCR approval, grandfathered)
- Commissioner has right to ban materials, require further testing, impose conditions of use

2008 Building Code Chapters

34 chapters and 11 appendices

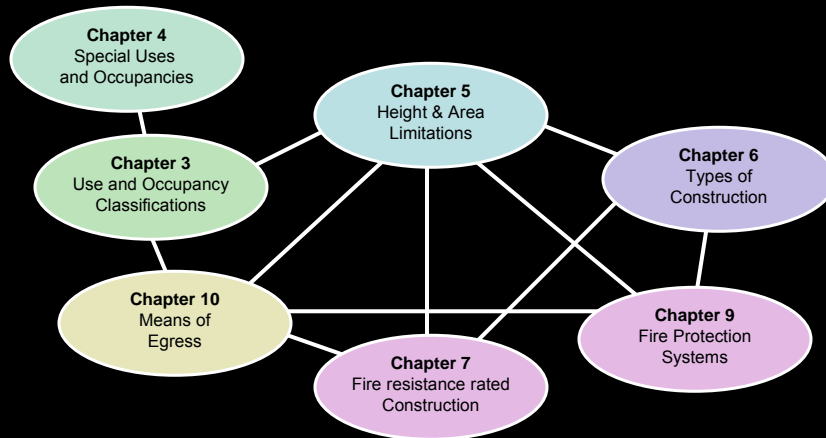
2008 Building Code		1968 Building Code
Title 28-Administration (Chapter 1)		Title 26 Subch. 1-4 Title 27 Subch. 1
Ch. 2	Definitions	Title 27 Subch.2
Ch. 3	Use and Occupancy Classifications	Title 27 Subch. 3
Ch. 4	Special Detailed Requirements Based on Use and Occupancy	Title 27 Subch. 7
Ch. 5	General Building Heights and Areas	Title 27 Subch. 4
Ch. 6	Types of Construction	Title 27 Subch. 3, 5
Ch. 7	Fire-Resistance-Rated Construction	Title 27 Subch. 5
Ch. 8	Interior Finishes	Title 27 Subch.5
Ch. 9	Fire Protection Systems	Title 27 Subch. 7, 17
Ch. 10	Means of Egress	Title 27 Subch. 6, 8
Ch. 11	Accessibility	Title 27 Subch. 4
Ch. 12	Interior Environment	HMC, MDL, Title 27 Subch.12
Ch. 13	Energy Efficiency	NYS Energy Code
Ch. 14	Exterior Walls	Title 27 Subch. 5

2008 Building Code		1968 Building Code
Ch. 15	Roof Assemblies and Rooftop Structures	Title 27 Subch. 5
Ch. 16	Structural Design	Title 27 Subch. 9,10
Ch. 17	Structural Tests and Special Inspections	Title 27 Subch. 1,10,11
Ch. 18	Soils and Foundations	Title 27 Subch. 1, 11, 19
Ch. 19	Concrete	Title 27 Subch. 10, 19
Ch. 20	Aluminum	Title 27 Subch. 10
Ch. 21	Masonry	Title 27 Subch. 10, 15
Ch. 22	Steel	Title 27 Subch. 10
Ch. 23	Wood	Title 27 Subch. 10
Ch. 24	Glass and Glazing	Title 27 Subch. 10
Ch. 25	Gypsum Board and Plaster	Title 27 Subch. 10
Ch. 26	Plastic	Title 27 Subch. 5
Ch. 27	Electrical	Title 27 Subch. 6, 7, NYC Electrical Code
Ch. 28	Mechanical Systems	Title 27 Subch. 13, 14, 15
Ch. 29	Plumbing Systems	Title 27 Subch. 16
Ch. 30	Elevators and Conveying Systems	Title 27 Subch. 18
Ch.31	Special Construction	Title 27 Subch. 4, 7
Ch. 32	Encroachments Into the Public Right-of-Way	Title 27 Subch. 3, 4

2008 Building Code		1968 Building Code
Ch. 33	Safeguards During Construction	Title 27 Subch. 19
Ch. 35	Referenced Standards	Appendix to Title 27, Chapter 1
App. D	Fire Districts	Title 27 Subch. 3, 4, 5
App. E	Supplementary Accessibility	Title 27 Subch. 4
App. F	Rodent Proofing	MDL §80.6, RS 16
App. G	Flood-Resistant Construction	Title 27 Subch. 4
App. H	Outdoor Signs	Title 27 Subch. 7
App. K	Elevators	RS 18.1
App. M	Supplementary Requirements for One- and Two-Family Dwellings	Directive 6 of 1979
App. N	Assistive Listening Systems	Title 27 Subch. 4, RS 4-6
App. P	Toilet & Bathing Facilities in R-2 Occupancies	Title 27 Subch. 4, RS 4-6, TPPN 8/88, 15/88, 22/88
App. Q	Modified National Standards for Automatic Sprinkler, Standpipe, and Fire Alarm Systems	RS 17-1, 17-2, 17-2A, 17-2B, 17-5
App. R	Acoustical Tile and Lay-In Panel Ceiling Suspension Systems	RS 5-16

2008 Building Code Chapters

Occupancies, fire protection, and egress



Use and Occupancy Classifications



2008 Code		1968 Code
A	Assembly: Groups A-1, A-2, A-3, A-4, and A-5	F
A-1	with fixed seating, intended for production and viewing of the performance arts or motion pictures .	F-1a
A-2	food and/or drink consumption.	F-4
A-3	worship, recreation or amusement (physically active) , and other assembly uses not classified elsewhere in Group A.	F-3, F-1b, F-4
A-4	indoor sporting events with spectator seating .	F-1b
A-5	participation in or viewing outdoor activities .	F-2
B	Business: office, professional, service-type transaction, public or civic services.	E
E	Educational: 5 or more persons at any time for educational purposes.	G
F	Factory and industrial: Groups F-1 and F-2	D
F-1	moderate-hazard .	D-1
F-2	involve non-combustible, non-flammable materials, or low-hazardous production .	D-2
H	High Hazard: Groups H-1, H-2, H-3, H-4, and H-5	A
H-1	materials that present a detonation hazard .	A
H-2	uses present a deflagration hazard or a hazard from accelerated burning .	A
H-3	materials that readily support combustion or present a physical hazard .	A
H-4	materials that are health hazards .	none
H-5	semiconductor fabrication facilities using hazardous production materials (HPM) in excess of the permitted aggregate quantity.	D-1

Use and Occupancy Classifications



2008 Code

1968 Code

I	Institutional: Groups I-1, I-2, I-3, and I-4	H, J-2
I-1	housing persons, on a 24-hour basis , capable of self-preservation and responding to an emergency situation without physical assistance from staff.	J-2
I-2	medical, surgical, nursing or custodial care , on a 24-hour basis , of more than 3 persons, who are not capable of self-preservation or responding to an emergency situation without physical assistance from staff.	H-2
I-3	more than 5 persons who are detained under restraint or security reason.	H-1
I-4	day care facilities, occupied by persons of any age who receive custodial care (without overnight) by individuals other than parents, guardians, or relatives in a place other than at the home.	H-2
M	Mercantile: display and sale of merchandise.	C
R	Residential: Groups R-1, R-2, and R-3	J
R-1	occupied transiently (for less than one month) and student dormitories.	J-1
R-2	more than 2 dwelling units on a long term basis (for a month or more).	J-2
R-3	not more than 2 apartments on a long term basis (for a month or more).	J-3
S	Storage: Groups S-1, and S-2	B
S-1	moderate-hazard storage occupancy for any flammable or combustible materials.	B-1
S-2	low-hazard storage occupancy for non-combustible materials.	B-2
U	Utility and Miscellaneous: structures of an accessory character, or not classified in any specific occupancy .	K

Use and Occupancy Classifications



Section 13: Building Characteristics

Applicant must specify designation for dominant occupancy classification of building, construction classification, and multiple dwelling classification (if applicable). Existing and proposed must be supplied when required for all jobs except new buildings where only a proposed value is required. For proposed occupancy classification, only 2008 Code designations are accepted, even if the application is not being filed under the 2008 Code. For information on how to "translate" your prior to 2008 Code occupancy classification designation into a 2008 Code designation refer to [Code Compass Fact Sheet: Use and Occupancy Classifications](#).

- **Structural Occupancy Category:** See Appendix E for Structural Occupancy Categories.
- **Seismic Design Category:** See Appendix F for Seismic Design Categories.
- **Occupancy Classification:** See Appendix B for Building Occupancy Classifications.
- **Construction Classification:** See Appendix C for Construction Classifications.
- **Multiple Dwelling Classification:** See Appendix D for Multiple Dwelling Classifications.

Schedule A

Existing Legal Use						
Floor	Maximum Number of Persons	Live Load (psf)	2008 Code Designations? <input type="checkbox"/> Yes <input type="checkbox"/> No	Building Code Occupancy Group(s)	Dwelling/ Rooming Units (BC)	Zoning Use Group(s)
Description						

Proposed Use						
<i>*Use 2008 Code equivalents only even for older Codes.</i>						
	Maximum Number of Persons	Live Load (psf)	2008 Code Designations only* <input checked="" type="checkbox"/> Yes	Building Code Occupancy Group(s)	Dwelling/ Rooming Units (BC)	Zoning Use Group(s)
Description						

Use and Occupancy Classifications

Some changes from the 1968 code

- Assembly spaces occupied by fewer than 75 persons are classified as Group B (Business), not as an assembly occupancy.
- Educational uses for adults beyond the 12th grade, including universities, are classified as Group B (Business), not as an educational occupancy
- Non-production chemical laboratories are classified as Group B (Business), not as a factory/industrial occupancy
- Student Dormitories are classified as Group R-1 transient occupancy, as opposed to a J-2 non-transient occupancy.
 - New concept of Student Apartments (Group R-2) introduced

Height and Area Limitations

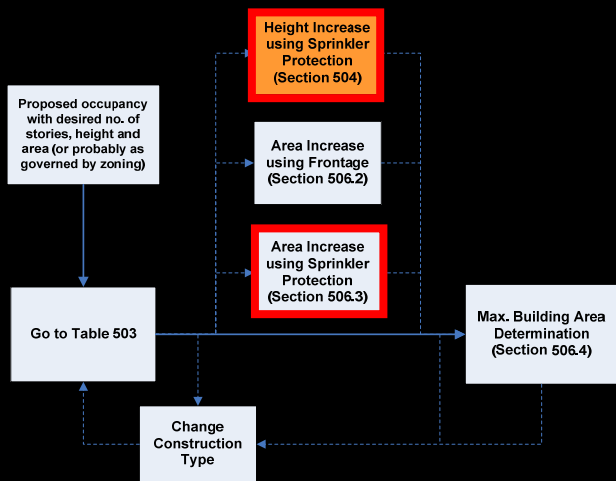


TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS³
 Height limitations shown as stories and feet above grade plane.
 Area limitations as determined by the definition of "Area, building," per floor.

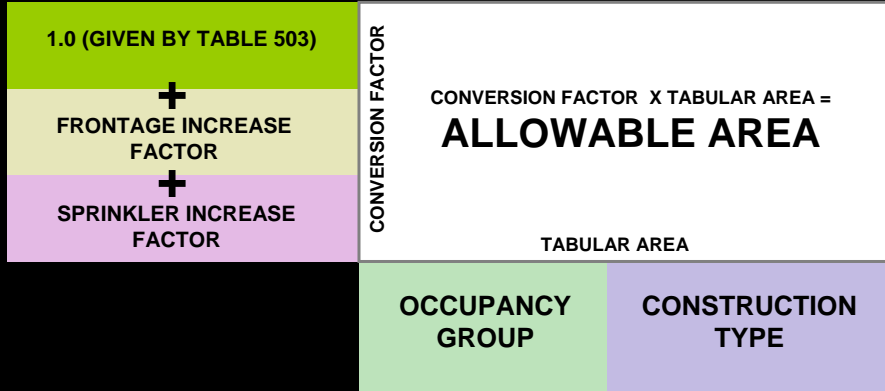
GROUP	Hgt(feet) Hgt(S)	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
		UL	160 ⁴	65	55	65	55	65	50	40
A-1	S	UL	UL	6	3	6	3	6	3	2
	A	UL	UL	17,500	10,500	14,700	5,600	15,000	8,400	5,500
A-2	S	UL	UL	6	3	6	3	6	3	2
	A	UL	UL	17,500	9,500	14,000	5,600	15,000	8,400	5,500
A-3	S	UL	UL	6	3	6	3	6	3	2
	A	UL	UL	17,500	9,500	14,000	5,600	15,000	8,400	5,500
A-4	S	UL	UL	6	3	6	3	6	3	2
	A	UL	UL	17,500	9,500	14,000	5,600	15,000	8,400	5,500
A-5	S	UL	UL	UL	UL	UL	UL	6	UL	UL
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	S	UL	UL	6	3	6	3	6	3	2
	A	UL	UL	37,500	10,500	28,000	5,600	36,000	8,400	5,500
E	S	UL	UL	4	3	4	3	6	3	2
	A	UL	UL	26,000	10,500	23,000	5,600	25,500	8,400	5,500
F-1	S	UL	UL	5	3	5	2	5	3	2
	A	UL	UL	12,500	7,500	7,500	3,000	10,000	3,000	1,000
F-2	S	UL	UL	6	3	6	3	6	3	2
	A	UL	UL	37,500	10,500	28,000	5,600	30,000	8,400	5,500

Not permitted in Fire District
 Not permitted in Fire District without sprinklers

Height and Area Limitations



Height and Area Limitations



Height and Area Limitations



Section 506 Area Modifications

Where a building is equipped throughout with an automatic sprinkler system*, such building is allowed to have:

- 200% increase in floor area over tabular limits for multi-story buildings
- 300% increase for single story buildings

* Where an automatic sprinkler system is installed to reduce the required fire-resistance rating by 1 hour as per Table 601, Note d, it may not be used again for height and area increase purposes in Chapter 5

Height and Area Limitations



Section 504 Height Modifications

Where a building is equipped throughout with an automatic sprinkler system*, such building is allowed to have:

- 20 feet additional height
- 1 additional story

* Where an automatic sprinkler system is installed to reduce the required fire-resistance rating by 1 hour as per Table 601, Note d, it may not be used again for height and area increase purposes in Chapter 5

Types of Construction



	Classification	Subclassification	Description of building elements
noncombustible	TYPE I	TYPE IA	Noncombustible building elements
		TYPE IB	
	TYPE II	TYPE IIA	
		TYPE IIB	
combustible	TYPE III	TYPE IIIA	Noncombustible exterior walls Combustible or noncombustible interior elements
		TYPE IIIB	
	TYPE IV	TYPE IV	Noncombustible exterior walls Heavy timber interior elements
	TYPE V	TYPE VA	Combustible building elements permitted by the code
		TYPE VB	

Types of Construction



**TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENT (hours)**

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V ¹	
	A	B	A ^d	B	A ^d	B	HT	A ^d	B
Structural frame ^a Including columns, girders, trusses	3 ^b	2 ^b	1	0	1	0	HT	1	0
Bearing walls									
Exterior ^{f,g}	3	2	1	0	2	2	2	1	0
Interior	3 ^b	2 ^b	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions	See Table 602								
Exterior	See Table 602								
Nonbearing walls and partitions	See Section 602.4.6								
Interior ^c	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction ^h Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction									
Including supporting beams and joists	1 1/2 ^c	1 ^c	1 ^c	0	1 ^c	0	HT	1 ^c	0

* Where an automatic sprinkler system is installed to reduce the required fire-resistance rating by 1 hour as per Footnote d, it may not be used again for height and area increase purposes in Chapter 5

Types of Construction



2008 Code construction types	Similar 1968 code construction classes
Type IA	Class I-B
Type IB	Class I-C
Type IIA	Class I-D
Type IIB	Class I-E
Type IIIA	Class II-B
Type IIIB	Class II-C
Type IV	Class II-A
Type VA	Class II-D
Type VB	Class II-E

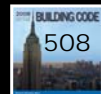
Combustible Materials in Types I & II



Combustible materials that may be used in Construction Type I and II; examples include:

- Fire-retardant-treated wood in:
 - Nonbearing interior partitions with fire-resistance rating \leq 1 hour (however, public corridors and exits must be of noncombustible materials)
 - certain roof construction as per Table 601, Note c, Item 3
- Thermal and acoustical insulation with limited flame spread
- Foam plastics per Chapter 26
- Class A or B roof coverings
- Combustible exterior wall coverings in accordance with Chapter 14
- Interior finishes as permitted by Chapter 8, and
- Other applications as permitted by Section 603

Mixed Occupancies



- ❖ Single Use
- ❖ Incidental Use
- ❖ Mixed Use
 - Accessory
 - Nonseparated
 - Separated
- ❖ Separated Buildings

Incidental Use Areas



- A space listed on Table 508.2 and incidental to the main occupancy is considered an Incidental Use Area
 - Otherwise, treated as mixed occupancies
- The Incidental Use Area need only be separated and/or protected as indicated in Table 508.2
- Any additional fire protection requirements in Chapter 9, such as fire alarms, are based on the main occupancy classification
 - The floor area of the Incidental Use Area is included in the floor area of the main occupancy
- The Incidental Use Area shall be treated as being in the same occupancy group as its main occupancy for the purposes of calculating allowable height and area

Incidental Use Areas



Table 508.2

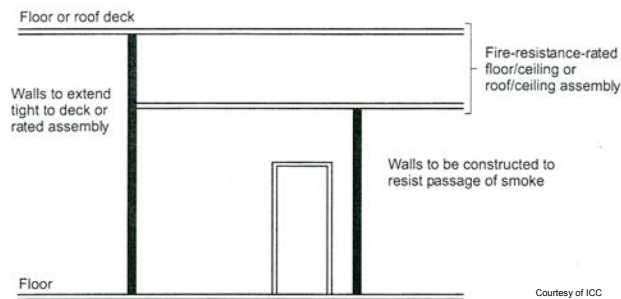
ROOM OR AREA	SEPARATION ^a
Furnace room where any piece of equipment is over 400,000 Btu per hour input	2 hour; or 1 hour and provide automatic fire-extinguishing system
Furnace room where any piece of equipment is 400,000 Btu per hour input or less, except in R-3 occupancy	1 hour or provide automatic sprinkler system
Rooms with any boiler over 15 psi and 10 horsepower	2 hour; or 1 hour and provide automatic fire-extinguishing system
Rooms with any boiler 15 psi or less and 10 horsepower or less, except in R-3 occupancy	1 hour or provide automatic sprinkler system
Mechanical and/or electrical equipment room, except in R-3 occupancy	1 hour or provide automatic sprinkler system
Refrigerant machinery rooms	1 hour or provide automatic sprinkler system
Parking garage (Section 406.2)	2 hours; or 1 hour and provide automatic fire-extinguishing system
Hydrogen cut-off rooms	2-hour fire barriers and floor/ceiling assemblies in all occupancy groups.
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing system
Laboratories and vocational shops, not classified as Group H, located in Group E or I-2 occupancies	2 hour; or 1 hour and provide automatic fire-extinguishing system
Laundry rooms over 100 square feet, except within dwelling units	1 hour or provide automatic fire-extinguishing system
Storage rooms over 100 square feet, except in R-3 occupancy	1 hour or provide automatic fire-extinguishing system
Group I-3 cells equipped with padded surfaces	1 hour
Group I-2 waste and linen collection rooms	1 hour

Incidental Use Areas



Where an automatic fire-extinguishing system or sprinkler system is permitted in lieu of a fire barrier:

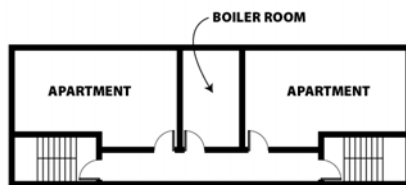
- The partitions must resist passage of smoke, and
- Doors must be self- or automatic closing upon smoke detection, shall not have air transfer opening, shall not have excessive undercut.



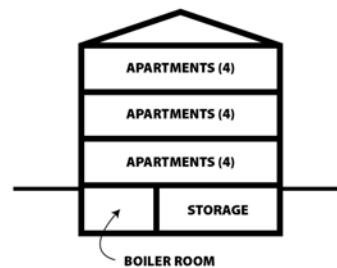
Incidental Use Areas



Rooms with any boiler 15psi or less and 10 hp or less...



Example 1



Example 2

The incidental use area is classified in the same occupancy group as the space that it serves.

Separated Occupancies



Table 508.3.3

REQUIRED SEPARATION OF OCCUPANCIES (HOURS)*																										
USE	A-1	A-2	A-3	A-4	A-5	B ^b	E	F-1	F-2	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	M ^b	R-1	R-2	R-3, R-4	S-1	S-2 ^c	U	
A-1	—	2	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1	
A-2 ^d	—	—	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1	
A-3	—	—	—	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1	
A-4	—	—	—	—	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1	
A-5	—	—	—	—	—	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1	
B ^b	—	—	—	—	—	—	2	3	2	NP	2	1	1	1	2	2	2	2	2	2	2	2	3	2	1	
E	—	—	—	—	—	—	—	3	2	NP	4	3	2	3	2	2	2	2	2	2	2	2	3	2	1	
E-1	—	—	—	—	—	—	—	—	3	NP	2	1	1	1	3	3	3	3	3	3	3	3	3	3	3	
E-2	—	—	—	—	—	—	—	—	—	NP	2	1	1	1	2	2	2	2	2	2	2	2	3	2	1	
H-1	—	—	—	—	—	—	—	—	—	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	
H-2	—	—	—	—	—	—	—	—	—	—	1	2	2	4	4	4	4	4	4	4	4	4	4	2	1	
H-3	—	—	—	—	—	—	—	—	—	—	—	1	1	4	3	3	3	1	3	3	3	3	1	1	1	
H-4	—	—	—	—	—	—	—	—	—	—	—	1	4	4	4	4	4	1	4	4	4	4	1	1	1	
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	4	4	3	1	4	4	4	1	1	3	
I-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	2	2	4	3	2	
I-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	2	3	2	1	
I-3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	3	2	1	
I-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	3	2	1	
M ^b	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	3	2	1
R-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	3	2	1
R-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3	2	1
R-3, R-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	2 ^d	1 ^d	
S-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	
S-2 ^c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	
U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Mixed Occupancies



Accessory occupancies

Nonseparated occupancies

Separated occupancies

Accessory Occupancies



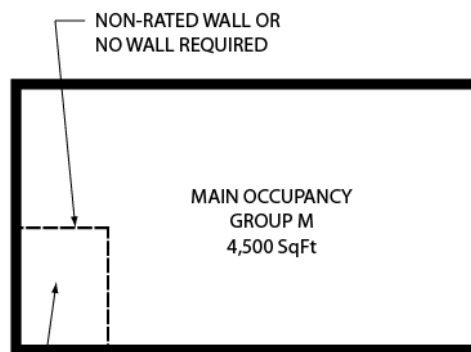
To qualify as an accessory occupancy:

1. The area must be subsidiary to the main occupancy
2. Aggregate of all accessory occupancies located on a single story does not exceed 10% of the floor area of the story where the accessory use areas are located**, and
3. Does not exceed the tabular values in Table 503 for each accessory occupancy (no height and area increases allowed for the accessory occupancies)

H-2 through H-5 occupancies must be treated as separated occupancies.

** Exceptions include Assembly areas less than 750 SF, Assembly areas accessory to Group E, and accessory religious educational rooms and religious auditoriums with less than 100 occupants

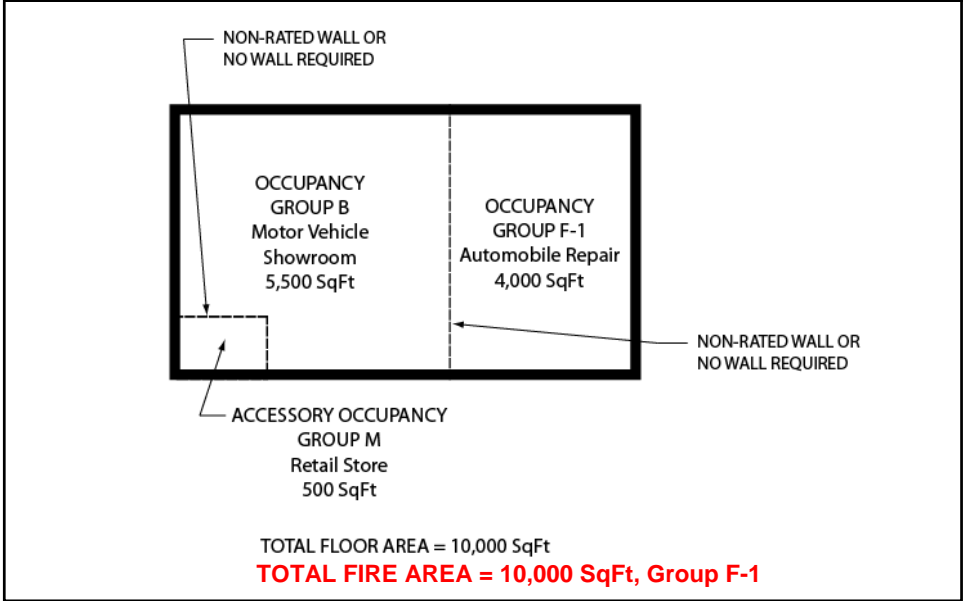
Accessory Occupancies



TOTAL FLOOR AREA = 5,000 SqFt

TOTAL FIRE AREA = 5,000 SqFt, Group M

Nonseparated Occupancies



Nonseparated Occupancies



Separation	Occupancy Group	Allowable Height & Area	Code requirements
No separation required	Individually classified	Based on the <i>most restrictive</i> allowances for the occupancy groups under consideration for the type of construction of the building	<p>Most restrictive applicable provisions of Section 403 and Chapter 9 shall apply to the entire building</p> <p>Other code requirements (means of egress, design occupant load, exterior wall rating, etc.) shall be based on the actual occupancy of the space.</p>

Separated Occupancies



General Concepts:

- Occupancies must be separated according to Table 508.3.3.

Occupancies that pose the same risk may not require separation, such occupancies are still considered separated for height and area limitation purpose, but the size of a fire area is potentially increased. Therefore, the larger fire area may exceed the fire area thresholds in Section 903 and may require automatic sprinkler systems.

For most occupancies, the required separations may be reduced by 1 hour with an automatic sprinkler system, but not less than that required for the floor and not less than 1 hour, whichever is higher

- The allowable height is occupancy dependant.

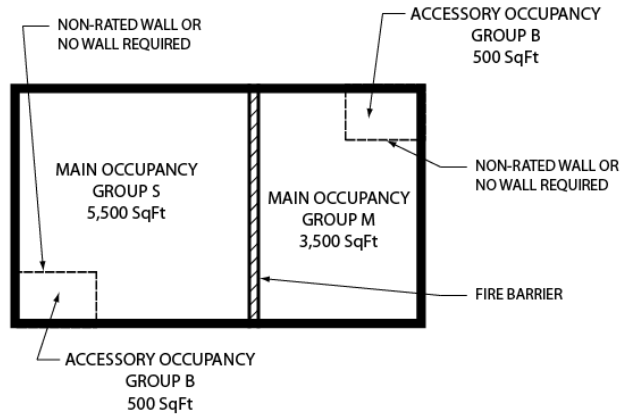
Separated Occupancies



Table 508.3.3 (Partial)

USE	REQUIRED SEPARATION OF OCCUPANCIES													
	A-1	A-2	A-3	A-4	A-5	B ^b	E	F-1	F-2	H-1	H-2	H-3	H-4	H-5
A-1	—	2	2	2	2	2	2	3	2	NP	4	3	2	4
A-2 ^c	—	—	2	2	2	2	2	3	2	NP	4	3	2	4
A-3	—	—	—	2	2	2	2	3	2	NP	4	3	2	4
A-4	—	—	—	—	2	2	2	3	2	NP	4	3	2	4
A-5	—	—	—	—	—	2	2	3	2	NP	4	3	2	4
B ^b	—	—	—	—	—	—	2	3	2	NP	2	1	1	1
E	—	—	—	—	—	—	—	3	2	NP	4	3	2	3
F-1	—	—	—	—	—	—	—	—	3	NP	2	1	1	1
F-2	—	—	—	—	—	—	—	—	—	NP	2	1	1	1
H-1	—	—	—	—	—	—	—	—	—	—	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	1	2	2
H-3	—	—	—	—	—	—	—	—	—	—	—	—	1	1
H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	1
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Separated Occupancies



TOTAL FLOOR AREA = 10,000 SqFt

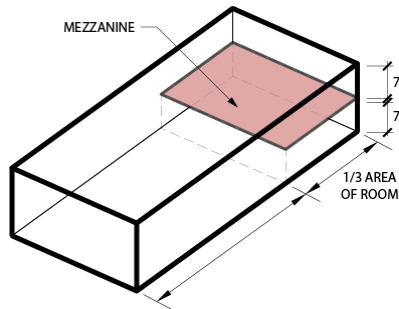
**TOTAL FIRE AREAS = 6,000 SqFt, Group S
4,000 SqFt, Group M**

Nonseparated Occupancies



Separation	Occupancy Group	Allowable Height & Area	Code requirements
As per Table 508.3.3	Individually classified	<p>Allowable Height: Each occupancy must comply with height limitations based on the type of construction of the building</p> <p>Allowable Area: In each story, the building area shall be such that the sum of the ratios of the actual floor area of each occupancy divided by the allowable area of each occupancy shall not exceed one</p>	Each fire area must comply with the code based on the occupancy classification of such fire area

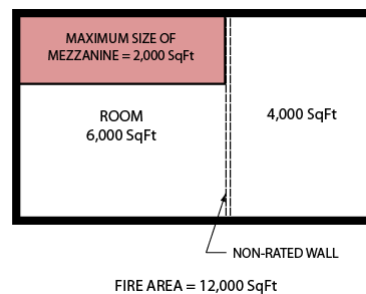
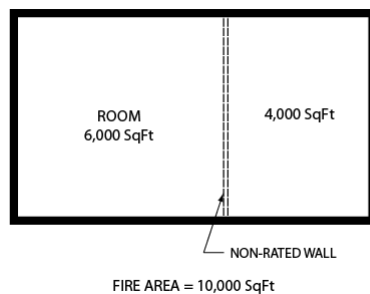
Mezzanines



Floor area of the room = **3,000 SF**
 Floor area of mezzanine = **1,000 SF**
 For height & area limitations, floor area = **3,000 SF**
 For fire area, floor area = **4,000 SF**

- The aggregate area of all mezzanines in a room cannot exceed 1/3 of the floor area of the room
- The floor area of the mezzanine is not included in the floor area of the room below when determining height & area limitations.
- The mezzanine is not considered an additional story.
- The area of the mezzanine is included in the area of the room below for calculating the size of the fire area.

Mezzanines



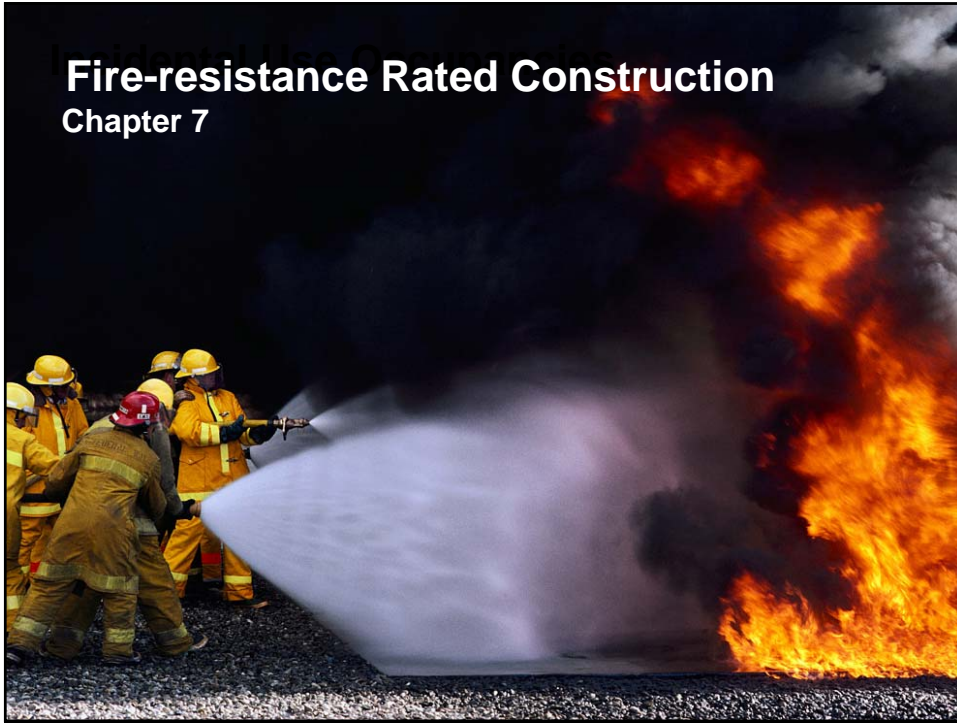
The enclosed portions of a room shall not be included in determining the permissible floor area of the mezzanine.

EXCEPT:

The aggregate area of a mezzanine or mezzanines within a dwelling unit shall not exceed one-third of the net floor area of such dwelling unit, whether or not portions of such dwelling unit are enclosed.

Fire-resistance Rated Construction

Chapter 7



Exterior Walls



Designed to contain the fire to the building of origin and prevent its spread to adjoining properties.

For Fire Rating, refer to:

- **Table 601** Protection based on Construction Type
- **Table 602** Fire Separation Distance based on
 - Distance between buildings
 - Construction Type and
 - Occupancy

**TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENT (hours)**

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V ¹	
	A	B	A ^d	B	A ^d	B	HT	A ^d	B
Structural frame ^a Including columns, girders, trusses	3 ^b	2 ^b	1	0	1	0	HT	1	0
Bearing walls									
Exterior ^{f,g}	3	2	1	0	2	2	2	1	0
Interior	3 ^b	2 ^b	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions	See Table 602								
Exterior	See Table 602								
Interior ^a	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction ^h Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction Including supporting beams and joists	1 1/2 ^c	1 ^c	1 ^c	0	1 ^c	0	HT	1 ^c	0

**TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE^{a,d,e}**

FIRE SEPARATION DISTANCE (feet)	TYPE OF CONSTRUCTION	GROUP H	GROUP F-1, M, S-1	GROUP A, B, E, F-2, I, R ^B , S-2, U
< 5 ^e	All	3	2	1
≥ 5	IA	3	2	1
< 10	Others	2	1	1
≥ 10	IA, IB	2	1	1
< 30	IIB, VB	1	0	0
	Others	1	1	1
≥ 30	All	0	0	0

Fire Separation Distance



- Exterior load-bearing walls: Table 601 + Table 602
- Exterior nonload-bearing walls: Table 602 only
- Additional requirements for exterior walls in fire district (Note d and e)
- Additional provisions for exterior walls and openings in Section 704

FIRE SEPARATION DISTANCE (feet)	TYPE OF CONSTRUCTION	GROUP H	GROUP F-1, M, S-1	GROUP A, B, E, F-2, I, R ^B , S-2, U
< 5 ^e	All	3	2	1
≥ 5	IA	3	2	1
< 10	Others	2	1	1
≥ 10	IA, IB	2	1	1
< 30	IIB, VB	1	0	0
	Others	1	1	1
≥ 30	All	0	0	0

Fire Separation Distance



Defined in section 702:

FIRE SEPARATION DISTANCE. The distance measured from the building face to the closest interior tax lot line, to the centerline of a street or other public space, or to an imaginary line between two buildings on the same tax lot. The distance shall be measured at right angles from the face of the wall.

Fire Separation Distance

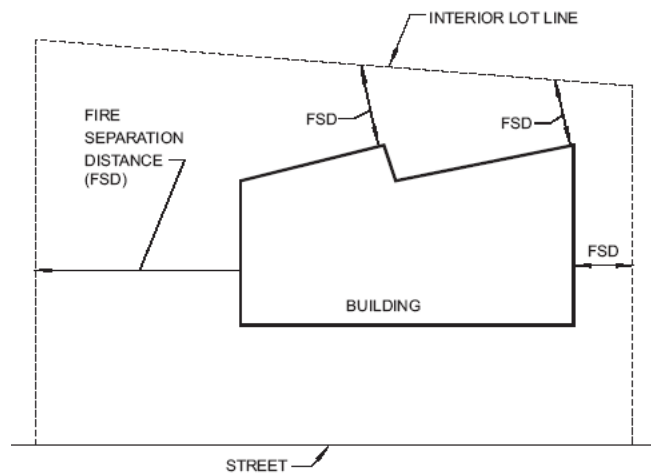


Figure 702.1(6)
FIRE SEPARATION DISTANCE MEASURED TO AN INTERIOR LOT LINE

Courtesy of ICC

Fire Separation Distance

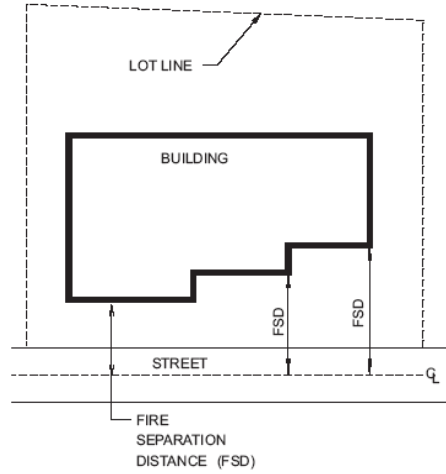


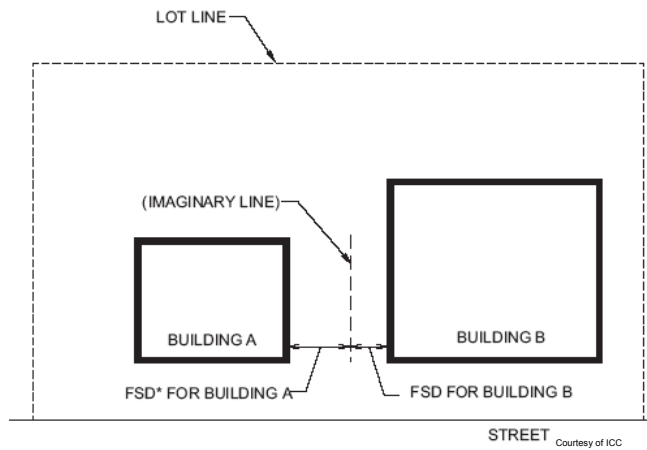
Figure 702.1(7)
FIRE SEPARATION DISTANCE MEASURED TO THE CENTERLINE OF A STREET

Courtesy of ICC

Fire Separation Distance

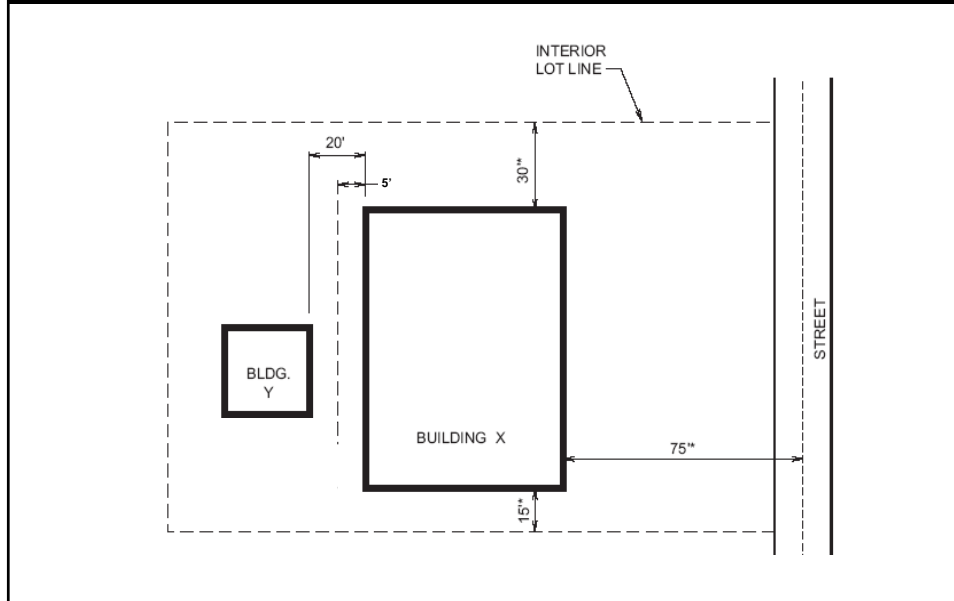


Buildings on the same tax lot
Fire separation distance measured to an imaginary line between buildings



*FSD: FIRE SEPARATION DISTANCE

Fire Separation Distance



Exterior Walls



- Table 704.8 prescribes the area limitations, as a percentage of exterior wall area, for both unprotected and protected openings, based upon separation distances, irrespective of construction class.
 - Compare to 1968 code Table 3-4
- Table 704.8 permits unprotected openings within separation distance of 15 feet
 - 1968 code permits the equivalent only for construction classes II-D and II-E

TABLE 704.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS^{a,d}

CLASSIFICATION OF OPENING	FIRE SEPARATION DISTANCE (feet)							
	0 to 3 ^b	Greater than 3 and not more than 5 ^b	Greater than 5 and not more than 10 ^{b,f}	Greater than 10 and not more than 15 ^{b,f}	Greater than 15 and not more than 20 ^f	Greater than 20 and not more than 25 ^{c,f}	Greater than 25 and not more than 30 ^f	Greater than 30
Unprotected	Not Permitted ^e	Not Permitted ^{e,k}	10%	15%	25%	45%	70%	No Limit
Protected	Not Permitted ^d	15% ^k	25% ^k	45% ^k	75% ^k	No Limit ^k	No Limit ^k	No Limit

Exterior Walls



–Both protected and unprotected openings are permitted within the same exterior wall, limited in area through a formulary (Equation 7-2)

$$\frac{A}{a} + \frac{A_u}{a_u} \leq 1.0 \quad \text{(Equation 7-2)}$$

where:

A = Actual area of protected openings, or the equivalent area of protected openings, A_e (see Section 704.7).

a = Allowable area of protected openings.

A_u = Actual area of unprotected openings.

a_u = Allowable area of unprotected openings.

–the amount of unprotected openings in exterior walls is permitted to equal the permitted amount of protected openings in fully sprinklered buildings

–fully sprinklered buildings are not required to provide vertical separation of openings

Opening Protectives



TABLE 715.3
FIRE DOOR AND FIRE SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3
	3	3 ^a
	2	1½
	1½	1½
Fire barriers having a required fire-resistance rating of 1 hour: Shaft exit enclosure and exit passageway walls Other fire barriers	1	1
	1	¾
Fire partitions: Corridor walls Other partitions	1	¾
	1	¾
Exterior walls	3	1½
	2	1½
	1	¾

a. Two doors, each with a fire protection rating of 1½ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

Interior Elements

- Fire Separation of *Occupied Spaces*
 - FIRE WALL
 - FIRE BARRIER
 - FIRE PARTITION
- Smoke Separation of *Occupied Spaces*
 - SMOKE BARRIER
 - SMOKE PARTITION
- Separation of *Concealed Spaces*
 - FIRESTOPPING
 - FIREBLOCKING
 - DRAFT STOP

Fire Wall



A fire resistance rated wall, with protected openings, extending continuously from the foundation through or to a roof assembly

- Each portion of a building separated by fire walls shall be considered a separate building.
- Similar to (but not same as) 1968 code FIRE DIVISION
- Fire ratings based on occupancy, refer to Table 705.4
 - Minimum rating 2 hours
 - If mixed occupancy, most restrictive rating used

TABLE 705.4
FIRE WALL FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING (hours)
A, B, E, H-4, I, R-1, R-2, U	3 ^a
F-1, H-3 ^b , H-5, M, S-1	3
H-1, H-2	4 ^b
F-2, S-2, R-3, R-4	2

- a. Walls shall be not less than 2-hour fire-resistance rated where separating buildings of Type II or V construction.
b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.

Fire Wall



MATERIALS

- Materials are **non-combustible**
 - Only Exception: Type V Construction

OPENINGS

- Unsprinklered buildings
 - Each opening shall not exceed 120 sq ft
 - Aggregate width of openings at any floor level not to exceed 25% of length of wall
- Both buildings sprinklered
 - Individual openings *not* limited to 120 sq ft
 - Aggregate width of openings at any floor level not to exceed 25% of length of wall

Fire Wall



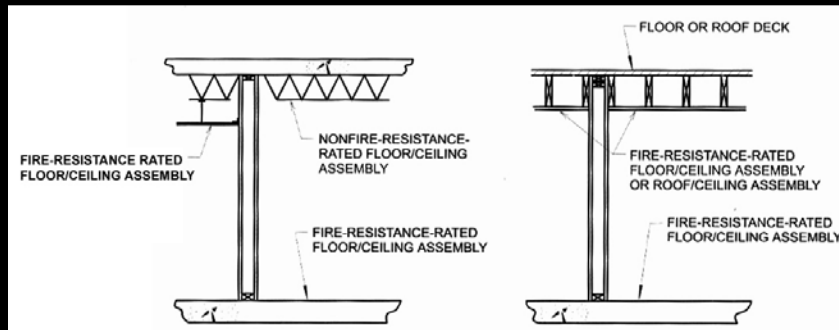
PARTY WALLS

- All party walls, which are built on property lines between adjoining buildings, are to be constructed as fire walls (Section 503.2)
- Attached one- and two-family dwellings shall be separated by walls constructed in accordance with Section 705 or Appendix M (one- and two-family dwellings not more than 3 stories in height or 2100 square feet in area, limited to Type IIIA, IIIB, VA, and VB construction)

Fire Barrier



A fire resistance rated horizontal or vertical assembly with protected openings. A fire barrier wall must extend from the floor below, through any concealed spaces, to the underside of the floor or roof slab above.



Fire Barrier



- Both vertical and Horizontal Continuity
- Vertical
 - Continuous from top of fire rated floor/ceiling assembly below to underside of floor/roof assembly above
 - No circumstances where top of a fire barrier is permitted to terminate at ceiling level
 - Hollow spaces firestopped at every floor level
- Horizontal
 - Continuous without openings except as permitted

Fire Barrier



For separating

- Fire Areas
- Public corridors
- Incidental Use Areas
- Shafts
- Hazardous Material Control Areas

Fire Barrier



- Subdivides single and mixed use occupancies within a single building.
- Fire Rating based on occupancy
 - Mixed Use Occupancies refer Table 508.3.3.
 - Single Occupancies refer Table 706.3.7.

TABLE 706.3.7
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE
BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2
U	1

Fire Barrier: Separated Occupancies



Table 508.3.3 (Partial)

USE	REQUIRED SEPARATION OF OCCUPANCIES													
	A-1	A-2	A-3	A-4	A-5	B ^b	E	F-1	F-2	H-1	H-2	H-3	H-4	H-5
A-1	—	2	2	2	2	2	2	3	2	NP	4	3	2	4
A-2 ^c	—	—	2	2	2	2	2	3	2	NP	4	3	2	4
A-3	—	—	—	2	2	2	2	3	2	NP	4	3	2	4
A-4	—	—	—	—	2	2	2	3	2	NP	4	3	2	4
A-5	—	—	—	—	—	2	2	3	2	NP	4	3	2	4
B ^b	—	—	—	—	—	—	2	3	2	NP	2	1	1	1
E	—	—	—	—	—	—	—	3	2	NP	4	3	2	3
F-1	—	—	—	—	—	—	—	—	3	NP	2	1	1	1
F-2	—	—	—	—	—	—	—	—	—	NP	2	1	1	1
H-1	—	—	—	—	—	—	—	—	—	—	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	1	2	2
H-3	—	—	—	—	—	—	—	—	—	—	—	—	1	1
H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	1
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Fire Barrier



Hazardous Materials Control Area

- Design alternative for handling Hazardous Materials
- Enclosed spaces within a building bounded by exterior walls, fire walls, fire barriers, roofs and/or a combination thereof
 - Compartmentation and separation of HM's into pre-defined quantities based on properties and physical/health hazards as per **Table 307.1 & 2**
- Permits non-hazard occupancies to keep their occupancy designation without being classified as H

Shaft Enclosures

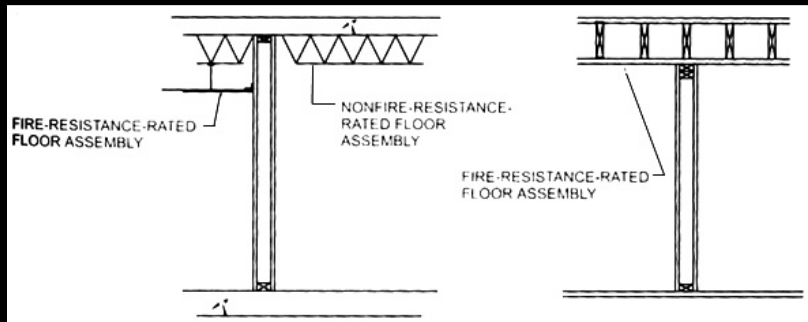


- shaft enclosure materials as permitted by the building type of construction, except in Groups I-1, R-1 and R-2 buildings which require shafts of noncombustible materials.
 - The 1968 code requires noncombustible materials for shaft enclosures in almost every instance, except in Class II-E construction.
- 2-hour fire-resistance rating required, or 1 hour if connecting fewer than 4 stories
- Shaft enclosures of refuse and laundry chutes must be 2-hour fire-resistance-rated, with no additional requirements for materials or construction type
- Impact resistant stair and elevator shaft requirement for high-rise buildings of any occupancy

Fire Partitions



- 1 hour fire-resistance-rated
- A vertical assembly with protected openings.
A fire partition need not extend through any concealed spaces provided that the partition intersects a fire-rated ceiling assembly and the concealed space is fire blocked or draft stopped at the partition line



Fire Partitions



For separating

- Interior corridors
- Tenant separations in fully sprinklered covered mall buildings

Fire Barrier vs. Partition



FIRE BARRIER

vs.

FIRE PARTITION

- | | | |
|--|--|--|
| <ul style="list-style-type: none">• Horizontal and Vertical• Vertical assembly continuous through concealed spaces• Rating is occupancy dependent and starts at 2 hours for other than U occupancies• Materials used by Construction Type | | <ul style="list-style-type: none">• Vertical only• Continuous through concealed ceiling space or stop at rated ceiling<ul style="list-style-type: none">– Blocking required in concealed spaces of combustible constructions• Rated for 1 hour regardless of occupancy• Materials used by Construction Type |
|--|--|--|

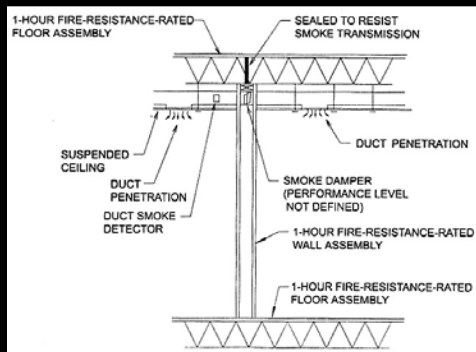
Smoke Barrier vs. Partition



Smoke separation of occupied spaces

- SMOKE BARRIER (Section 709)
 - Either vertical or horizontal
 - A 1 hour fire-resistance-rated membrane, designed to restrict the movement of smoke.
- SMOKE PARTITION (Section 710)
 - A vertical membrane designed to restrict the movement of smoke.
 - Not necessarily required to be fire-resistance rated

Smoke Barriers



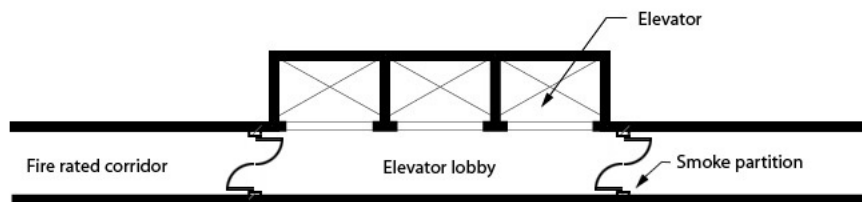
SMOKE BARRIER, WALL SECTION

- Create 'smoke compartments' as horizontal areas of refuge in special use buildings covered in Chapter 4
 - I-2 – hospitals, nursing homes
 - I-3 - prisons, jails, detention centers
 - Underground buildings
 - building spaces for human occupancy more than 30 ft below lowest level of exit discharge

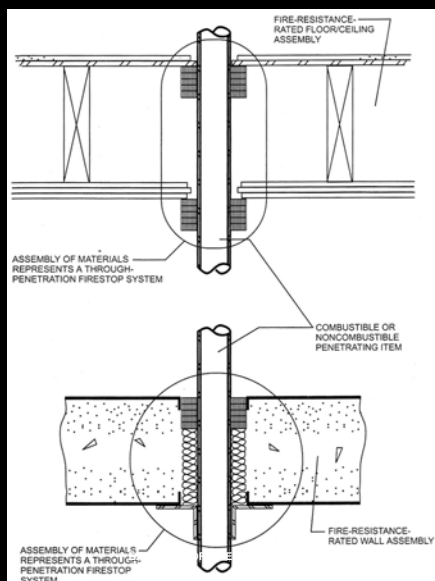
Smoke Partitions



- No fire rating required because occupancy is required to be protected by auto sprinklers
- For use in corridors in special I-2 Occupancies
- For use in constructing smokeproof elevator lobbies in high-rise construction



Separation of Concealed Spaces



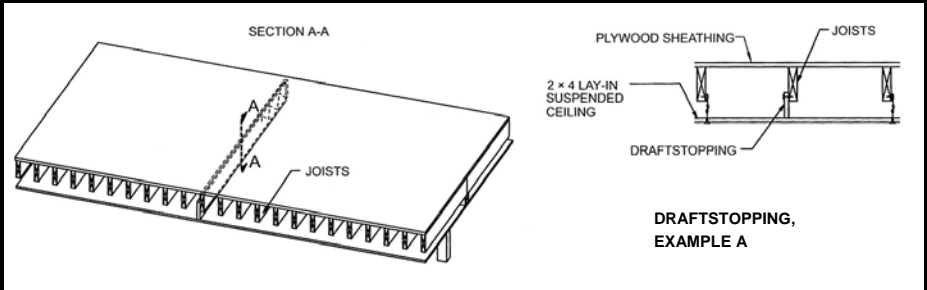
- FIRESTOPPING
 - A fire-resistance-rated assembly of materials installed to resist the free passage of flame or hot gases
 - generally applied to penetrations of fire-resistance rated construction (Section 712)
- FIREBLOCKING
 - An assembly of materials installed to resist the free passage of flame or hot gases.
 - Not necessarily required to be fire-resistance rated

Separation of Concealed Spaces

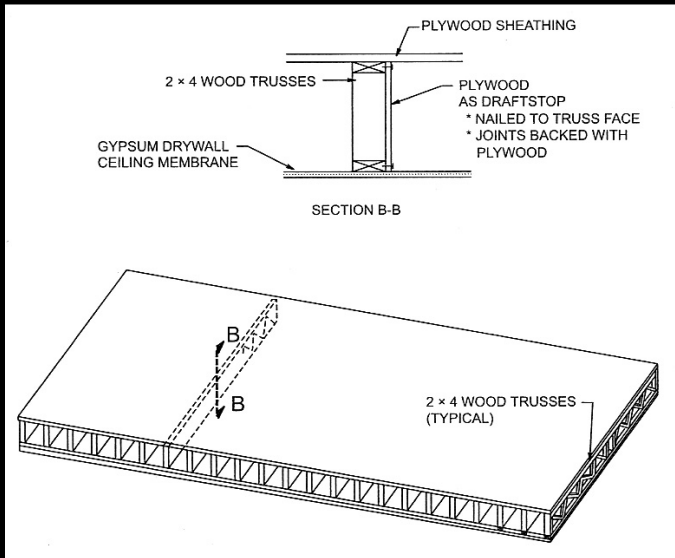


• DRAFT STOP

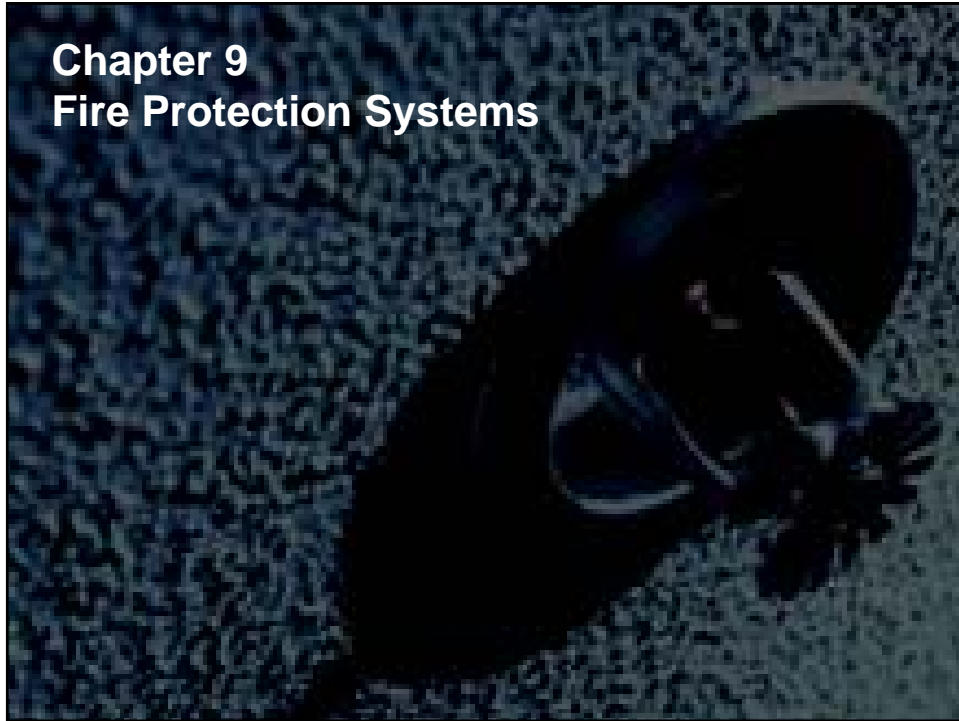
- An assembly of materials installed to resist the free passage of air in concealed spaces.
- Not required to be fire-resistance rated
- Horizontal Only
- Relies on the insular capacity of large open spaces to retard smoke and gas travel



Draftstopping



Chapter 9 Fire Protection Systems



Highlight of Changes in the 2008 Codes

- Automatic sprinkler and fire alarm systems will be required in more spaces and buildings
- The Fire Code provides guidance for alternative fire extinguishing systems.
- Almost all residential occupancies will be equipped with an automatic sprinkler system
- High rise buildings will require secondary on-site water supplies

Automatic Sprinkler Protection



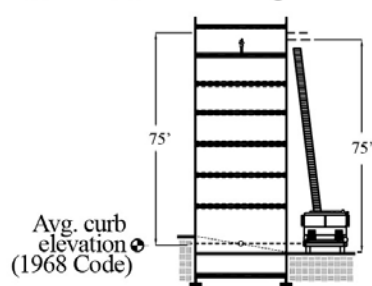
Sprinkler requirements based on:

- **Occupancy classification of Fire Area**
- **Size of Fire Area**
- **Aggregate size of multiple Fire Areas**
- **Location of Fire Area relative to Lowest Level of Fire Department Vehicle access**
- **Special occupancies**
 - e.g. high-rise, atrium, underground structures
- **To meet height/area for desired construction type per Chapter 5**

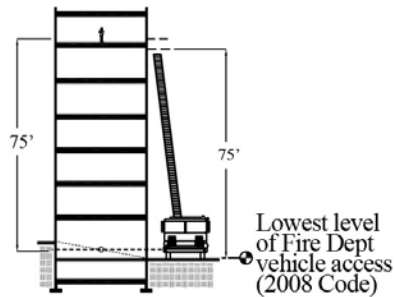
High-rise buildings



- ✓ = Yes, it *is* a high rise
- ✗ = No, it's *not* a high rise



1968 Code: ✓
2008 Code: ✗



1968 Code: ✓
2008 Code: ✓

Automatic Sprinkler Protection



EXAMPLE: Automatic sprinkler system required for:

Assembly Groups A-1, A-2, A-3 and A-4

throughout the floor area where located, and all floors between the Group A occupancy and the level of exit discharge where:

- Fire area > 12,000 sq. ft. (5,000 sq. ft. in A-2).
- Fire area has an occupant load of 300 or more.
- The aggregate occupant load of all fire areas by Group A, located on any given floor other than level of exit discharge, is 300 or more.
- Group A-1 fire area contains a multi-theater complex.
- Group A-2 occupancy used as a cabaret.

Automatic Sprinkler Protection



EXAMPLE: Automatic sprinkler system required for:

Mercantile Group M

throughout the fire area containing a Group M occupancy where :

- Fire area > 7,500 sq. ft.
- Fire area of any size is located more than 3 stories above grade.
- Fire area of any size is located in a high-rise building.
- Fire area of any size contains an unenclosed stair or escalator connecting two or more floors.

Automatic Sprinkler Protection



EXAMPLE: Automatic sprinkler system required for:

Mercantile Group M

throughout the *entire building* containing a Group M occupancy where :

- Fire area > 12,000 sq. ft.
- Combined area of all Group M fire areas on all floors, including mezzanines > 24,000 sq. ft.

Automatic Sprinkler Protection



Automatic sprinkler system required throughout spaces and throughout buildings with a main use or dominant occupancy of:

- **High-Hazard Group H fire areas**
- **Institutional Group I fire area**
- **Residential Group R fire area**
 - Exceptions:
 - Detached one- and two-family dwellings < 4 stories
 - Attached one-family dwellings (townhouses) < 4 stories

Automatic Sprinkler Protection



Buildings Over 55 Feet in Height

Automatic sprinkler system required throughout buildings with a floor level having an **occupant load of 30 or more that is located 55 feet or more** above the lowest level of fire department vehicle access.

Automatic Sprinkler Protection



- Covered malls
- Special amusement buildings
- High-rise buildings
- Atriums
- Group H-2
- Flammable finishes
- Underground buildings
- Unlimited area buildings
- Group I-2
- Stages

Buildings Bulletin 2009-006

Occupancy Group or Specified Use	Conditions that require a sprinkler system	Sprinkler system required only in fire area	Sprinkler system required throughout entire building
F (BC 903.2.3)	Group F-1 fire area > 7,500 sq ft	Yes	
	Group F-1 fire area > 12,000 sq ft		Yes
	Group F-1 fire area of any size located more than 3 stories above grade		Yes
	Aggregate of Group F-1 fire areas on all floors > 24,000 sq ft		Yes
	Group F fire area meets Section 280 of the New York State Labor Law for "factory buildings" defined in Section 2 of such law		Yes
	Group F-1 fire area containing wood working operations > 2,500 sq ft that generate finely divided combustible waste or use finely divided combustible materials		Yes
	Group F-1 fire area containing a repair garage > 10,000 sq ft in a building two or more stories in height		Yes
	Group F-1 fire area containing a repair garage > 12,000 sq ft in a one-story buildings		Yes
H (BC 903.2.4)	Group F-1 fire area containing a repair garage servicing vehicles parked in the basement		Yes
	Group H-1, H-2, H-3, or H-4 fire area of any size	Yes	
	Main use or dominant occupancy of building is any Group H		Yes
	Group H-5 fire area of any size		Yes
	Buildings, or portions thereof, where cellulose nitrate film or		

Automatic Sprinkler Protection



Sprinkler systems designed, installed and maintained in accordance with:

- NFPA 13 – 2002, as modified for NYC
- NFPA 13R – 2002, as modified for NYC
- NFPA 13D – 2002, as modified for NYC

Testing and maintenance per NYC Fire Code

Automatic Sprinkler Protection



Quick- response and residential sprinklers as part of a required automatic sprinkler system must be installed in the following areas:

- Throughout all spaces within a smoke compartment containing patient dwelling units in Group I-2.
- Dwelling units in Group R and I-1 occupancies.
- Light hazard occupancies as defined by NFPA 13.

Automatic Sprinkler Protection



Secondary Water Supply (§ 903.5.2)

A secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for :

1. high-rise building in Seismic Design Category C or D
2. high-rise building greater than 300 feet in height

Alternative Fire-Extinguishing



Automatic fire-extinguishing systems, other than automatic sprinkler systems (i.e. water-based), shall be designed, installed, inspected, tested and maintained in accordance with the *Fire Code*.

Except: **Commercial cooking systems** are required to be protected by carbon dioxide or wet-chemical extinguishing systems as per the *Building Code*

Alternative Fire-Extinguishing



Standards as per the *NYC Fire Code*:

- Dry-chemical NFPA 17
- Wet-chemical NFPA 17A
- Foam systems NFPA 11 and NFPA 16
- Carbon dioxide NFPA 12
- Halon systems NFPA 12A
- Clean-agent NFPA 2001
- Water-mist NFPA 750

Standpipe Systems



This section provides the conditions where standpipe systems are required and the locations for hose connections.

Standpipe systems installed in accordance with this section and **NFPA 14** as modified in Appendix Q.

Standpipe systems are permitted to be combined with automatic sprinkler systems.

Standpipe Systems



Standpipe systems shall be installed throughout the following buildings:

- Buildings ≥ 2 stories and floor area $\geq 10,000$ sq. ft. on any story;
- Buildings ≥ 3 stories and floor area $\geq 7,500$ sq. ft. on any story;
- Buildings of any size with an occupant load of 30 or more on a floor located ≥ 55 feet above the lowest level of fire department vehicle access;
- All high-rise buildings

Standpipe Systems



Standpipe systems shall be installed throughout the following buildings:

- Nonsprinklered Group A with occupant load > 1,000
- Covered mall buildings
- Stages
- Underground buildings
- Helistops

Fire Alarm Systems



A few highlights of the new code:

- Installations in accordance with **NFPA 72**, as modified for NYC in Appendix Q
- Mechanical and electrical equipment rooms of *any* size must be equipped with smoke detectors connected to a fire alarm system
- Smoke detectors must be installed in elevator lobbies.

Fire Alarm Systems



Construction documents must include at least:

1. A floor plan that indicates the use of all rooms.
2. Locations of alarm-initiating and notification appliances.
3. Alarm control and trouble signaling equipment.
4. Annunciation.
5. Power connection.
6. Fire alarm riser diagram and all fire alarm devices indicated on the floor plans
7. Copies of any variances granted by the department or the Fire Department.
8. Legend of all fire alarm symbols and abbreviations.
9. Design criteria for fire alarm audibility in various occupancies indicated on plans.
10. Fire alarm sequence of operation for the fire alarm control panel and the central station transmitter.
11. The interface of fire safety control functions.

Fire Alarm Systems



Fire alarm requirements based on:

- **Occupancy classification of Fire Area**
- **Occupant load of Fire Area**
- **Location of Fire Area relative to Lowest Level of Fire Department Vehicle access**
- **Special occupancies**
 - e.g. high-rise, underground structures



Fire Alarm Systems



Where an automatic fire alarm system is required, selective coverage **smoke detectors** shall be located as follows, unless partial or total coverage automatic detection is specified:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room, in elevator machine rooms, and in elevator lobbies.
2. In air distribution systems (see Section 606 of the *Mechanical Code*).

Fire Alarm Systems



A manual and automatic fire alarm system shall be installed in:

- Group A with occupant load of 300 or more
- Group B and M with an occupant load ≥ 500 , or > 100 above or below lowest level of exit discharge
- Group E occupancies
- Group F occupancies ≥ 2 stories and occupant load ≥ 100 , or when ≥ 25 persons above/below lowest level of exit discharge
- High-Hazard Group H
- Institutional Group I
- Mercantile Group M
- Residential Group R (with exceptions)

Fire Alarm Systems



Smoke detectors within dwelling units in R-1 occupancies

Smoke detectors and audible notification appliances shall be installed in dwelling units and shall be annunciated by dwelling unit at a constantly attended location from which the fire alarm system is capable of being manually activated. Smoke detectors are required in the following areas:

1. In sleeping areas.
2. In every room in the path of means of egress from the sleeping area to the door leading from the dwelling unit.
3. In each story within a dwelling unit, including below-grade stories.

Fire Alarm Systems



Smoke detectors in R-2 occupancies

An automatic fire alarm system without alarm notification in Group R-2 occupancies, other than student apartments.

The activation of any detector shall initiate a signal at a central station or a constantly attended location. Smoke detectors located as follows:

1. Mechanical equipment, electrical, transformer, telephone equipment or similar room greater than 75 sq. ft.
2. In air distribution systems per *NYC Mechanical Code*.
3. In elevator machine rooms and in elevator lobbies.

Fire Alarm Systems



Smoke detectors in R-2 occupancies

Where the main use of dominant occupancy of a building is classified as R-2 student apartment, fire alarm system installed in accordance with the requirements for R-1 occupancies.

Where the building is occupied *partially* by Group R-2 student apartments (more than 15 student apartments, manual fire alarm system must be installed throughout all public corridors serving student apartments and student related uses including recreation rooms, lounges, dining rooms, laundry rooms and storage rooms.

Fire Alarm Systems



Single and Multiple-station smoke alarms

Required in Groups R-2, R-3 and I-1 located as follows:

1. On the ceiling or wall outside of each room used for sleeping purposes within 15 feet from the door to room.
2. In each room used for sleeping purposes.
3. In each story within a dwelling unit, including below-grade stories and penthouses of any area.

Within an individual dwelling unit, the smoke alarms or detectors shall be *interconnected* in such a manner that activation of one alarm activates all alarms.

Fire Alarm Systems



An emergency voice/alarm communications system required in:

- Group A with occupant load \geq 1,000
- Special amusement buildings
- Covered mall buildings
- Atriums
- High-rise buildings

Exceptions:

1. Group I-1 and I-2 occupancies.
2. Group R-2 occupancies*

Fire Alarm Systems



Emergency voice/alarm communications system

Operation of initiating devices shall automatically sound an alarm tone followed by live voice instructions giving approved information and directions on a general or selective basis to the following areas on a minimum of the alarming floor, floor above and floor below:

1. Elevator lobbies.
2. Corridors.
3. Rooms and tenant spaces exceeding 1,000 sq. ft.
4. Dwelling units in R-1 occupancies.
5. Areas of rescue assistance.

Emergency Alarm Systems



This section provides the requirements for alarms to detect and notify of emergency conditions in Group H occupancies.

- Emergency alarms in a Hazardous Production Material facility.
- Gas detection systems in spaces storing or using highly toxic and toxic gases.
- Gas detection systems in ozone gas-generator rooms.
- Flammable-gas detection systems in repair garages.
- Refrigerant detector with an audible/visual alarm in machinery rooms.

Smoke Control Systems



This section provides the requirements for smoke control systems in the following conditions:

- Atrium buildings
- Covered malls
- Stages
- Underground buildings
- Smokeproof enclosures

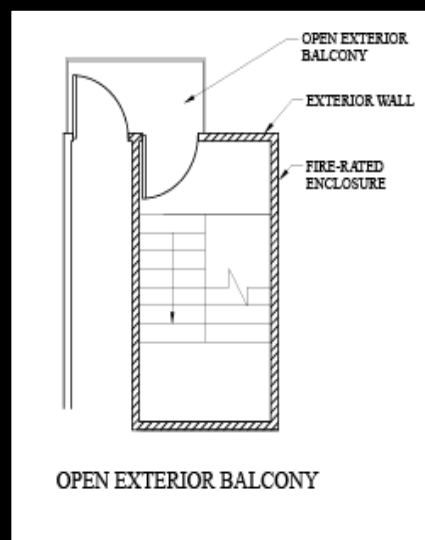
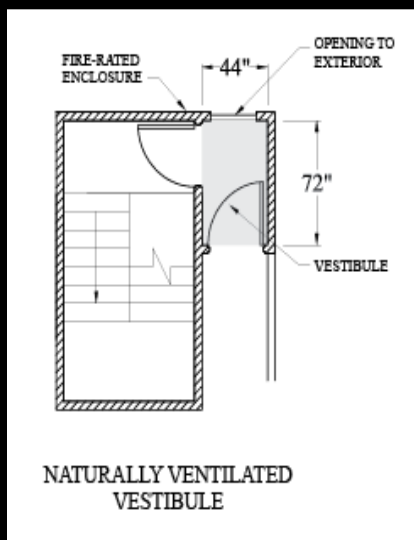
Smoke Control Systems



Smokeproof enclosures in high-rise buildings consisting of an enclosed interior exit stairways, each provided with one of the following:

- An open exterior balcony
- A naturally ventilated vestibule (2 hr rated)
- A mechanically ventilated vestibule (2 hr rated)
- Pressurization within the stairway

Smoke Control Systems



Smoke Purge Systems



- Capability to exhaust smoke from occupied spaces via dedicated equipment, the HVAC system or other openings
- Required in the following occupancies:
 - High-rise buildings
 - Exception for R-2 with operable windows or smokeproof enclosures
 - Buildings with any story > 50,000 sq. ft.
 - Spaces > 100 ft from natural ventilation openings.
 - High piled stock or rack storage (see Fire Code).

Modified National Standards



Appendix Q – Modified National Standards for Automatic Sprinkler, Standpipe, and Fire Alarm Systems

NFPA 13

Standard for the Installation of Sprinkler Systems

NFPA 13D

Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

NFPA 13R

Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and including Six Stories in Height

NFPA 14

Standard for the Installation of Standpipe and Hose Systems

NFPA 72

National Fire Alarm Code

NFPA 13 - Sprinklers



The referenced standard in this section is up-to-date and more relevant to current technologies and practices

The requirements for sprinklers in commercial cooking applications are deleted in their entirety from NFPA 13 since the proposed code does not permit the use of water sprinkler systems in such applications

The modifications to NFPA 13 by the proposed code do not require Department approval and wholly accept devices and systems listed for their use by nationally recognized testing entities.

NFPA 14 - Standpipes



The 1968 code does not modify a nationally recognized standard, and instead provides requirements in Subchapter 17 of the Building Code and the Reference Standards.

Systems and devices that are listed in accordance with this standard are permitted as-of-right and do not require Department approval.

NFPA 14 - Standpipes



Manual Fire Pumps no longer required

Redundant automatic and gravity-fed water supplies required

Larger tank sizes for on- site storage of water for fire-fighting purposes,

Dedicated high pressure siamese riser and zoned system that improves fire fighting capabilities.

Fire Districts



In addition, buildings constructed or altered inside the fire district must comply with both Chapter 6 and Appendix D-Fire Districts, whichever is more restrictive

Exterior Load Bearing Walls



Inside the **FIRE DISTRICT**:

Table 602, Note d prescribes the fire-resistance rating of **exterior load-bearing walls** of Construction Type II

Fire-resistance rating requirements for exterior load-bearing walls in fire district based on fire separation distance

FIRE SEPARATION DISTANCE (FEET)	TYPE OF CONSTRUCTION	ALL OCCUPANCY GROUPS
< 5	II	2 ^a
≥ 5		2 ^a
< 10		
≥ 10		1
< 30		
≥ 30		Per Table 602

a. Occupancy Group H shall comply with Table 602

Min. 1-hour in Fire District



Section D102.2.4 of Appendix D:

In fire district, the fire-resistance rating of bearing walls, floors, roofs and their supporting structural members must comply with Table 601 but such fire rating must be no less than 1-hour.

There are 5 exceptions where compliance with Table 601 is sufficient. Buildings with automatic sprinkler system and buildings with 30 feet open space are among the 5 exceptions.

Construction Type V in Fire District



Construction Type V are generally not permitted in fire district, however, Section D 105.1 of Appendix D provides a number of exceptions:

Detached or semi-detached 1- and 2-family of Type VA construction is permitted in fire district where such building is (See Section D 105.1, Item 9) :

- 2 stories or less in height
- 2,500 SF or less in area, and
- Located in Zoning District R-2 through R-5

Or if the building is damaged, damaged portion may be constructed of Construction Type VA

Construction Type V in Fire District



Exceptions for Construction Type V in fire district

1-family dwellings may be constructed of Type VB construction in fire district provided such building is (See Section D 105.1, Item 9) :

- Located in Zoning District R-1
- In conformance with height and area limitations set forth in Table 503

Construction Type V in Fire District



Exceptions for Construction Type V in fire district

Existing 1- and 2-family dwellings of a type of construction otherwise not permitted in the fire district (See Section D 105.1, Item 7):

May be extended 25% of the floor area existing at the time of inclusion in the fire district by any type of construction permitted by this code.

FRTW in Type III Construction



Fire-retardant-treated wood (FRTW) may be used in exterior wall assemblies of a 2-hour rating or less, but:

Outside fire districts	Inside fire district
Exterior walls, fire walls, exit passageways, and shaft enclosures in I-1, R-1, R-2 occupancies must be of noncombustible materials (No FRTW)	
Group F subject to Section 270(1) of NYS Labor Law must be "fireproof" (No FRTW)	
Exterior load-bearing walls may be FRTW (where the walls have a 2-hour rating or less. Section 602.3)	Exterior load-bearing walls must be noncombustible (No FRTW. Section 602.3, exception 3)
Exterior nonload-bearing walls may be FRTW (where the walls have a 2-hour rating or less. Section 602.3)	Exterior nonload-bearing walls may be FRTW only if sprinkler system is equipped throughout (FRTW ok with condition. Section 602.3, exception 4)

NYC Fire Code

- Intended as a maintenance and operations code
- The “new” Fire Code is in effect
- Grandfathered in pre-2009 structures
- Some construction related requirements
 - Section 503 – Fire apparatus roads
see FAQ #3 under Chapter 5 on FDNY website:
<http://www.nyc.gov/html/fdny/html/firecode/faq.shtml>
 - Section 504 – Access to buildings and roofs
 - Section 508 – Private fire hydrants required when main front entrance is more than 250 feet from a hydrant

Questions?