

1

State of Connecticut IBC code update 2005 - 2012

MARK W. TEBBETS
NEW ENGLAND CODE CONSULTING
14 SUNRISE AVENUE
FAWCATUCK, CONNECTICUT 06379

Chapters 7-10

2

2012 International Building Code



- ▶ Chapter 7
- ▶ Fire and Smoke Protection Features

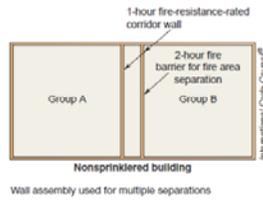
3

Chapter 7 Fire and Smoke Protection Features

701.1 Scope. The provisions of this chapter shall govern the materials, systems and assemblies used for structural *fire resistance* and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings.

4

701.2 Multiple-Use Fire Assemblies. Fire assemblies that serve multiple purposes in a building shall comply with all of the requirements that are applicable for each of the individual fire assemblies.



5

703.4 Automatic Sprinklers. Under the prescriptive fire resistance requirements of the *International Building Code*, the fire resistance rating of a building element, component, or assembly shall be established without the use of automatic sprinklers or any other fire suppression system being incorporated as part of the assembly system being tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E 119 or UL 263. However, this section shall not prohibit or limit the duties and powers of the building official allowed by Sections 104.10 and 104.11.

6

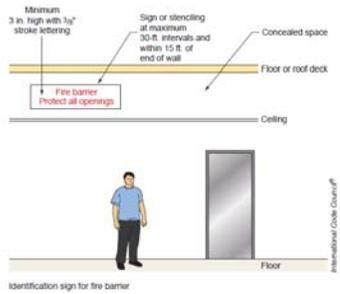


7

703.7 Marking and Identification. Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

- ▶ 1. Be located in accessible concealed floor, floor/ceiling, or attic spaces
- ▶ 2. Be located within 15 feet of the end of each wall and repeated at intervals not exceeding 30 feet measured horizontally along the wall or partition
- ▶ 3. Include lettering not less than 0.5 inch 3 inches in height with a minimum 3/8-inch stroke in a contrasting color incorporating the suggested wording: **"FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS"** or other wording.

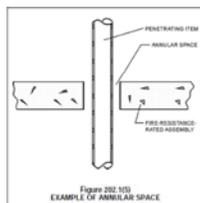
8



9

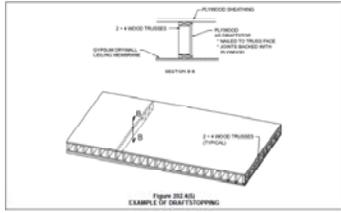
Those darn definitions again???

- ▶ **ANNULAR SPACE.** The opening around the penetrating item.



10

DRAFTSTOP. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and attics.



11

Mall. A roofed or covered common pedestrian area within a *covered mall building* that serves as access for two or more tenants and not to exceed three levels that are open to each other. The term "mall" shall include open malls as defined below.

12

COVERED MALL BUILDING. A single *building* enclosing a number of tenants and occupants, such as retail stores, drinking and dining establishments, entertainment and amusement facilities, passenger transportation terminals, offices and other similar uses wherein two or more tenants have a main entrance into one or more malls. *Anchor buildings* shall not be considered as a part of the covered mall building. The term "covered mall building" shall include *open mall buildings* as defined below.

13

Open mall. An unroofed common pedestrian way serving a number of tenants not exceeding three levels. Circulation at levels above grade shall be permitted to include open exterior balconies leading to *exits* discharging at grade.

Open mall building. Several structures housing a number of tenants, such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other similar uses, wherein two or more tenants have a main entrance into one or more open malls. *Anchor buildings* are not considered as a part of the open mall building.

14

DANGEROUS. Any *building, structure* or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The *building or structure* has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgment of any portion, member, appurtenance or ornamentation of the *building or structure* under service loads.

15

EXISTING STRUCTURE (For Section 1612.2). See "Existing construction."

EXISTING STRUCTURE (For Chapter 34). A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building *permit* has been issued.

EXISTING CONSTRUCTION. Any buildings and structures for which the *start of construction* commenced before the effective date of the community's first flood plain management code, ordinance or standard. "Existing construction" is also referred to as "existing structures."

16

EXTERIOR WALL ENVELOPE. A system or assembly of exterior wall components, including exterior wall finish materials, that provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space, from the detrimental effects of the exterior environment.

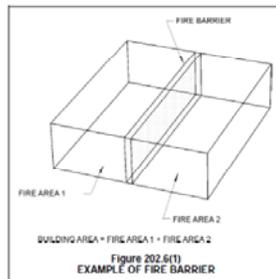
F RATING. The time period that the through-penetration fire stop system limits the spread of fire through the penetration when tested in accordance with ASTM E 814 or UL 1479.

17

FIRE AREA. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above.

18

FIRE BARRIER. A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.



19

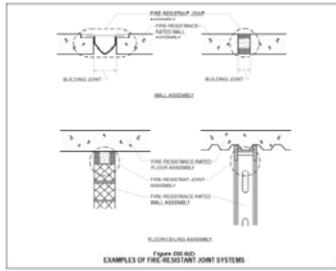
FIRE DAMPER. A *listed* device installed in ducts and air transfer openings designed to close *automatically* upon detection of heat and resist the passage of flame. Fire dampers are classified for use in either static systems that will *automatically* shut down in the event of a fire, or in dynamic systems that continue to operate during a fire. A dynamic fire damper is tested and rated for closure under elevated temperature airflow.

FIRE DOOR. The door component of a *fire door assembly*.

FIRE DOOR ASSEMBLY. Any combination of a *fire door*, frame, hardware and other accessories that together provide a specific degree of fire protection to the opening.

20

FIRE-RESISTANT JOINT SYSTEM. An assemblage of specific materials or products that are designed, tested and fire-resistance rated in accordance with either ASTM E 1966 or UL 2079 to resist for a prescribed period of time the passage of fire through *joints* made in or between fire-resistance rated assemblies.



21

FIRESTOP SYSTEM, THROUGH PENETRATION.

See "Through penetration firestop system."

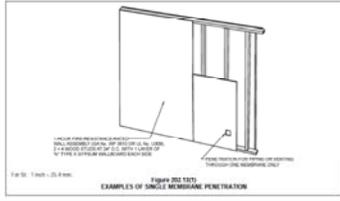
THROUGH-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor, floorceiling, or wall assembly, one or more penetrating items passing through the breaches in both sides of the assembly and the materials or devices, or both, installed to resist the spread of fire through the assembly for a prescribed period of time.

FIREBLOCKING. Building materials, or materials *approved* for use as fireblocking, installed to resist the free passage of flame to other areas of the building through concealed spaces.

22

THROUGH PENETRATION. A breach in both sides of a floor, floor-ceiling or wall assembly to accommodate an item passing through the breaches.

MEMBRANE PENETRATION. A breach in one side of a floor-ceiling, roof-ceiling or wall assembly to accommodate an item installed into or passing through the breach.



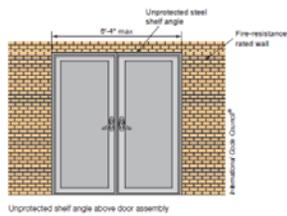
23

[A] MARK. An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material (see also "Inspection certificate," "Label" and "Manufacturer's designation").

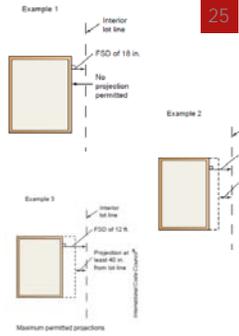
□ A mark represents the manufacturer's identification placed on a product, stating who made the product and describing its function. There is, however, no certification of compliance to any particular standard and no third-party quality control (see commentary, Section 1703.4). Also see the commentary for definitions of "Listed," "Label," "Labeled" and "Manufacturer's designation."

24

704.11 Bottom Flange Protection. Fire protection is not required at the bottom flange of lintels, shelf angles, and plates, spanning not more than 6 feet (1829 mm) & feet 4 inches (1931 mm) whether part of the primary structural frame or not, and from the bottom flange of lintels, shelf angles, and plates not part of the structural frame, regardless of span.



705.2 Projections. Cornices, eave overhangs, exterior balconies, and similar projections extending beyond the exterior wall shall conform to the requirements of this section and Section 1406. Exterior egress balconies and exterior exit stairways shall also comply with Sections 1019 and 1026, respectively. Projections shall not extend beyond the distance determined by the following three methods, whichever results in the lesser projection: any closer to the line used to determine the fire separation distance than shown in Table 705.2.



25

**TABLE 705.2
MINIMUM DISTANCE OF PROJECTION**

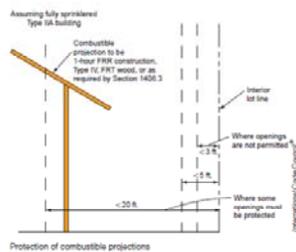
FIRE SEPARATION DISTANCE (FSD)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE FSD
0 feet to less than 2 feet	Projections not permitted
2 feet to less than 5 feet	24 inches
5 feet or greater	40 inches

For SI: 1 foot = 304.8 mm; 1 inch = 25.4 mm.

26

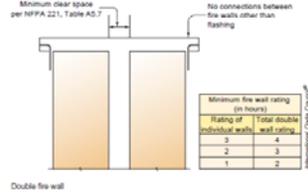
705.2.3 Combustible Projections. Combustible projections extending to within 5 feet of the line used to determine the fire separation distance, or located where openings are not permitted, or where protection of some openings is required shall be of at least 1-hour fire-resistance-rated construction, Type IV construction, fire retardant-treated wood, or as required by Section 1406.3.

Exception: Type VB construction shall be allowed for combustible projections in Group R-3 and U occupancy.



27

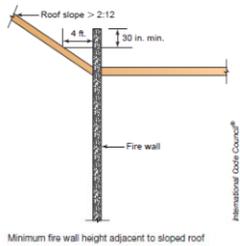
706.2 Structural Stability. Fire walls shall have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall for the duration of time indicated by the required fire-resistance rating or shall be constructed as double fire walls in accordance with NFPA 221.



706.6 Vertical Continuity. Fire walls shall extend from the foundation to a termination point at least 30 inches (762 mm) above both adjacent roofs.

Exceptions:

- 1.-5. (no changes to text)
- 6. Buildings with sloped roofs in accordance with Section 706.6.2.

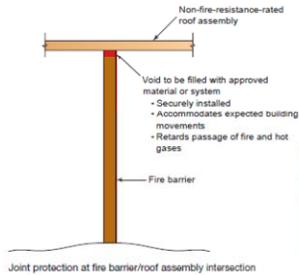


706.6.2 Buildings with Sloped Roofs. Where a fire wall serves as an interior wall for a building, and the roof on one side or both sides of the fire wall slopes toward the fire wall at a slope greater than 2 units vertical in 12 units horizontal (2:12), the fire wall shall extend to a height equal to the height of the roof located 4 feet (1219 mm) from the fire wall plus 30 inches (762 mm). In no case shall the extension of the fire wall be less than 30 inches (762 mm).

31

707.9 Voids at Intersections.

The voids created at the intersection of a fire barrier and a non-fire-resistance-rated roof assembly shall be filled. An approved material or system shall be used to fill the void, shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen, or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

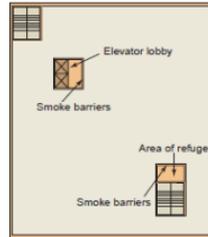


International Code Council®

32

709.4 Continuity. Smoke barriers shall form an effective membrane continuous from outside wall to outside wall and from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck,.....

- 2. Smoke barriers used for elevator lobbies in accordance with Section 405.4.3, 3007.4.2, or 3008.11.2 are not required to extend from outside wall to outside wall.
- 3. Smoke barriers used for areas of refuge in accordance with Section 1007.6.2 are not required to extend from outside wall to outside wall.



Continuity of smoke barriers

International Code Council®

33

**SECTION 708 712
SHAFT ENCLOSURES-VERTICAL OPENINGS**

712.1 General. The provisions of this section shall apply to the vertical opening applications listed in Sections 712.1.1 through 712.1.18. shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. Shaft enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 712, or both.



Piping extending through opening in floor

International Code Council®

713.4.1.2 714.4.1.2 Membrane Penetrations. Penetrations of membranes that are part of a horizontal assembly shall comply with Section 714.4.1.1.1 or 714.4.1.1.2. Where floor/ceiling assemblies are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

Exceptions:

- 1.-5. (no changes to text)
- 6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
- 7. The ceiling membrane of 1-hour and 2-hour fire-resistance rated horizontal assemblies is permitted to be interrupted with the double wood top plate of a fire-resistance wall assembly, provided that all penetrating items through the double top plates are protected in accordance with Section 714.4.1.1.1 or 714.4.1.1.2. The fire-resistance rating of the wall shall not be less than the rating of the horizontal assembly.

New definition

- L RATING.** The air leakage rating of a through-penetration fire stop system or a fire-resistant joint system when tested in accordance with UL 1479 or UL 2079, respectively.

716.3.1 Fire-Rated Glazing That Exceeds the Code Requirements. Fire-rated glazing assemblies marked as complying with hose stream requirements (H) shall be permitted in applications that do not require compliance with hose stream requirements. Fire-rated glazing assemblies marked as complying with temperature rise requirements (T) shall be permitted in applications that do not require compliance with temperature rise requirements. Fire-rated glazing assemblies marked with ratings (XXX) that exceed the ratings required by this code shall be permitted.

TEST STANDARD	MARKING	DEFINITION OF MARKING
ASTM E 119 or UL 257	H	Meets wall assembly criteria
NFPA 253 or UL 9	HT	Meets fire resistance assembly criteria including the hose stream test
ASTM E 119 or UL 257	T	Meets fire resistance assembly criteria
NFPA 253 or UL 9 or UL 9C	HT	Meets fire resistance assembly criteria including the hose stream test
	T	Meets EHT temperature rise criteria for HT assembly
	XXX	Exceeds the minimum fire resistance or fire protection rating of the glazing assembly.

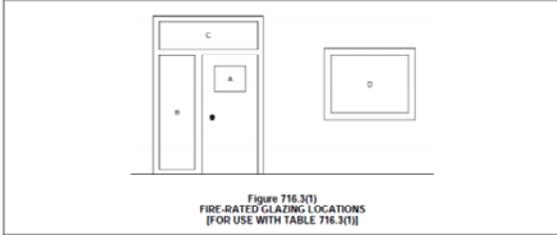
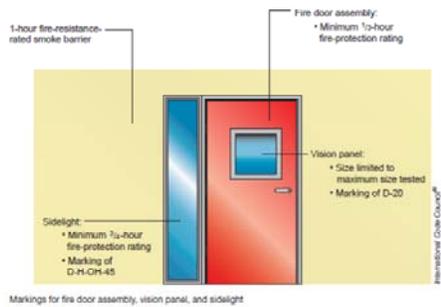


Figure 716.3(1)
FIRE-RATED GLAZING LOCATIONS
[FOR USE WITH TABLE 716.3(1)]

TABLE 716.3(1)
MARKINGS OF FIRE RATED GLAZING¹

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY MARKING ²	DOOR VIEW PANEL A MARKING ³	DOOR VIEW PANEL A MARKING ³	SEGLITE OR WINDOW MARKING ⁴	WINDOW ASSEMBLY MARKING ⁵
Fire wall and fire barrier wall	4 hr	Not Permitted	Not Permitted	W-240 ⁶	W-240 ⁶
	3 hr	Not Permitted	Not Permitted	W-180 ⁶	W-180 ⁶
	2 hr	[D-H-60] ⁷	[D-H-W-60] ⁷	W-120 ⁶	W-120 ⁶
Shaft, exit enclosures and exit passageway walls	1 1/2 hr	[D-H-90] ⁷	[D-H-W-90] ⁷	W-60 ⁶	W-60 ⁶
	2 hr	[D-H-90] ⁷	[D-H-W-90] ⁷ or [D-H-F-W-90] ⁷	W-120 ⁶	W-120 ⁶
Fire barriers for enclosures of shafts, exit enclosures, stairways, exit access ramps, entrance lock stairways and exit passageway walls	1 hr	[D-H-40] ⁷	[D-H-F-40] ⁷ or [D-H-F-W-40] ⁷	W-60 ⁶	W-60 ⁶
Other fire barriers	1 hr	[D-H-NF-40] ⁷	[D-H-NF-40] ⁷	[D-H-NF-40] ⁷	W-60 ⁶
Fire barriers - incidental use areas, mixed occupancy separations	1 hr	[D-H-NF-40] ⁷	[D-H-NF-40] ⁷	[D-H-NF-40] ⁷	[D-H-40] ⁷ or W-60 ⁶
Fire partitions, Corridor walls	1 hr	[D-20] ⁷	[D-20] ⁷	[D-H-20] ⁷	[D-H-40] ⁷ or W-60 ⁶
	0 1/2 hr	[D-20] ⁷	[D-20] ⁷	[D-H-20] ⁷	[D-H-20] ⁷ or W-30 ⁶
Other fire partitions	1 hr	[D-H-40] ⁷	[D-H-40] ⁷	[D-H-40] ⁷	[D-H-40] ⁷ or W-60 ⁶
	0 1/2 hr	[D-H-20] ⁷	[D-H-20] ⁷	[D-H-20] ⁷	[D-H-20] ⁷ or W-30 ⁶
Smoke barriers	1 hr	[D-20] ⁷	[D-20] ⁷	[D-H-20] ⁷	[D-H-40] ⁷ or W-60 ⁶
	1 1/2 hr	[D-H-90] ⁷	[D-H-W-90] ⁷	W-180 ⁶	[D-H-90] ⁷ or W-180 ⁶
Exterior walls ⁸	2 hr	[D-H-90] ⁷	[D-H-W-90] ⁷	W-120 ⁶	[D-H-90] ⁷ or W-120 ⁶
	1 hr	[D-H-40] ⁷	[D-H-40] ⁷	[D-H-40] ⁷	[D-H-40] ⁷ or W-60 ⁶

1. Markings in brackets () are fire protection-rated glazing. Fire protection-rated glazing in doors, sidelights, and transoms must be in a fire-rated wall assembly.
2. Fire protection-rated glazing in window walls must be in a fire-rated wall assembly.
3. Fire resistance-rated glazing meeting ASTM E 119 or UL 263.
4. Glazing meeting both the standard for fire protection-rated glazing in the doors (NFPA 701) and the standard fire resistance-rated glazing (ASTM E 119 or UL 263).
5. Glazing requirements where protected openings are required by Table 716.3.
6. Only openings necessary for egress and allowed in exit access stairways and stair exit stairs.
7. Only openings necessary for egress and allowed in exit access stairways and stair exit stairs.



Markings for fire door assembly, vision panel, and sidelight

715.4.4 716.5.5 Doors in Exit Enclosures Interior Exit Stairways and Ramps and Exit Passageways. Fire door assemblies in exit enclosures-interior exit stairways and ramps and exit passageways shall have a maximum transmitted temperature rise of not more than 450°F (250°C) above ambient at the end of 30 minutes of standard fire test exposure.

715.4.4.1 716.5.5.1 Glazing in Doors. Fire-protection-rated glazing in excess of 100 square inches (0.065 m²) is not permitted. Fire-resistance-rated glazing in excess of 100 square inches (0.065 m²) shall be permitted in fire door assemblies when tested as components of the door assemblies, and not as glass lights, and shall have a maximum transmitted temperature rise of 450°F (250°C) in accordance with Section 716.5.5.



716.5.4 717.5.4 Fire Partitions. Ducts and air transfer openings that penetrate fire partitions shall be protected with listed fire dampers installed in accordance with their listing.

- **Exceptions:** In occupancies other than Group H, fire dampers are not required where any of the following apply:
- 1.-3. (no changes to text)

NEW

4. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return, or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

717.2.6 Architectural trim-718.2.6 Exterior Wall Coverings. Fire blocking shall be installed within concealed spaces of exterior wall finish coverings and other exterior architectural elements where permitted to be of combustible construction as specified in Section 1406 or where erected with combustible frames. Fire blocking shall be installed at **maximum intervals of 20 feet (6096 mm)** in either dimension so that there will be no open concealed space exceeding 100 square feet (9.3 m³) between fire blocking. Where wood furring strips are used, they shall be of approved wood of natural decay resistance or preservative treated wood. If non continuous, such elements shall have closed ends, with at least 4 inches (102 mm) of separation between sections.

46

New

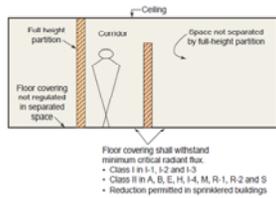
3. Fireblocking shall not be required where the exterior wall covering has been tested in accordance with, and complies with the acceptance criteria of, NFPA 285. The exterior wall covering shall be installed as tested in accordance with NFPA 285.

Chapter 8 Interior Finishes

47

804.4 Interior Floor Finish Requirements.

Interior floor covering materials shall comply with Sections 804.4.1 and 804.4.2, and interior floor finish materials shall comply with Section 804.2. In all occupancies, interior floor finish and floor covering materials in exit enclosures, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux as specified in Section 804.4.1.

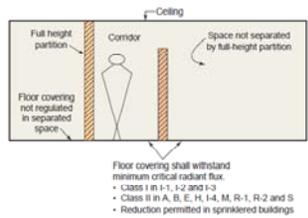


International Code Council®

NEW

804.4.2 Minimum Critical Radiant Flux. In all occupancies, interior floor finish and floor covering materials in enclosures for stairways and ramps, exit passageways, corridors, and rooms or spaces not separated from corridors by partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall not be less than Class I in Groups I-1, I-2, and I-3 and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2, and S.

48



International Code Council®

[F] 806.5 Interior trim. Material, other than foam plastic used as interior trim, shall have a minimum Class C flame spread and smoke-developed index when tested in accordance with ASTM E 84 or UL 723, as described in Section 803.1.1. Combustible trim, excluding handrails and guardrails, shall not exceed 10 percent of the specific wall or ceiling area in which it is attached.

[F] 806.6 Interior floor-wall base. Interior floor-wall base that is 6 inches (152 mm) or less in height shall be tested in accordance with Section 804.2 and shall not be less than Class II. Where a Class I floor finish is required, the floorwall base shall be Class I.

Exception: Interior trim materials that comply with Section 806.5.

Chapter 9 Fire Protection Systems

901.8 Pump and Riser Room Size. Fire pump and automatic sprinkler system riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working room around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair, or replacement without removing such elements of permanent construction or disabling the function of a required fire-resistance-rated assembly. Fire pump and automatic sprinkler system riser rooms shall be provided with a door(s) and unobstructed passageway large enough to allow removal of the largest piece of equipment.



903.2.2 Group B-Ambulatory Health Care Facilities. An automatic sprinkler system shall be installed throughout all fire areas the entire floor containing an ambulatory health care facility, where either of the following conditions exist at any time:

1. Four or more care recipients are incapable of self-preservation, whether rendered incapable by staff or staff has accepted responsibility for care recipients already incapable.
2. One or more care recipients that are incapable of self-preservation are located at other than the level of exit discharge serving such an facility occupancy.

NEW

In buildings where care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided as well as all floors below, and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.



52

903.2.7 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

- ▶ 1. A Group M fire area exceeds 12,000 square feet (1115 m²).
- ▶ 2. A Group M fire area is located more than three stories above grade plane.
- ▶ 3. The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).

NEW

- ▶ 4. A Group M occupancy area used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m²).

53

903.2.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

- ▶ 1. A Group S-1 fire area exceeds 12,000 square feet (1115 m²).
- ▶ 2. A Group S-1 fire area is located more than three stories above grade plane.
- ▶ 3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
- ▶ 4. A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m²).



NEW

- ▶ 5. A Group S-1 occupancy used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m²).

54

903.2.4 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

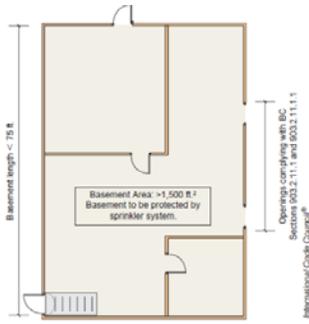
- ▶ 1. A Group F-1 fire area exceeds 12,000 square feet (1115 m²).
- ▶ 2. A Group F-1 fire area is located more than three stories above grade plane.
- ▶ 3. The combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
- ▶ 4. A Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses exceeds 2,500 square feet (232 m²).

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 (Was 20,000) square feet (1115 m²) in area.
2. Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.



Group E elementary school



Sprinkler requirements for basements

903.2.11.1.3 Basements. Where any portion of a basement is located more than 75 feet (22 860 mm) from openings required by Section 903.2.11.1, or where walls, partitions, or other obstructions are installed that restrict the application of water from hose streams, the basement shall be equipped throughout with an approved automatic sprinkler system.

907.2.1.2 Emergency Voice/Alarm Communication Captions. Stadiums, arenas, and grandstands required to caption audible public announcements shall be in accordance with Section 907.5.2.2.4.

907.5.2.2.4 Emergency Voice/Alarm Communication Captions. Where stadiums, arenas, and grandstands are required to caption audible public announcements in accordance with Section 1108.2.7.3, the emergency/voice alarm communication system shall also be captioned. Prerecorded or live emergency captions shall be from an approved location constantly attended by personnel trained to respond to an emergency.



Emergency voice/alarm communication required in large Group A occupancies

907.2.9.3 Group R-2 College and University Buildings.

An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 college and university buildings in the following locations:

- 1. Common spaces outside of dwelling units and sleeping units.
- 2. Laundry rooms, mechanical equipment rooms, and storage rooms.
- 3. All interior corridors serving sleeping units or dwelling units. Required smoke alarms in dwelling units and sleeping units in Group R-2 college and university buildings shall be interconnected with the fire alarm system in accordance with NFPA 72.



907.2.11.3 Interconnection.

Where more than one smoke alarm is required to be installed within an individual dwelling unit or sleeping unit in Group R-1, R-2, R-3 or R-4 R or I-1 occupancies, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. **Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.** The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.



908.7.1 Carbon Monoxide Detection Systems.

Carbon monoxide detection systems, that include carbon monoxide detectors and audible notification appliances—installed and maintained in accordance with this section for carbon monoxide alarms and NFPA 720 shall be permitted. The carbon monoxide detectors shall be listed as complying with UL 2075.



61



908.7 Carbon Monoxide Alarms. Group I or R occupancies located in a building containing a fuel-burning appliance or a building which has an attached garage shall be equipped with single station carbon monoxide alarms. The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in Chapter 2, or enclosed parking garage ventilated in accordance with Section 404 of the *International Mechanical Code* shall not be considered an attached garage.

Exception: Sleeping units or dwelling units which do not themselves contain a fuel-burning appliance or have an attached garage, but which are located in a building with a fuel-burning appliance or an attached garage, need not be equipped with single-station carbon monoxide alarms provided that:

1. The sleeping unit or dwelling unit is located more than one story above or below any story that contains a fuel-burning appliance or an attached garage.
2. The sleeping unit or dwelling unit is not connected by ductwork or ventilation shafts to any room containing a fuel-burning appliance or to an attached garage.
3. The building is equipped with a common-area carbon monoxide alarm system.

62

Chapter 10 Means of Egress

63

EXIT ACCESS. That portion of a *means of egress* system that leads from **any occupied** portion of a *building* or *structure* to an *exit*.

EXIT ACCESS DOORWAY. A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, *corridor*, *exit access stair* or *exit access ramp*.

EXIT ACCESS RAMP. An interior *ramp* that is not a required *interior exit ramp*.

EXIT ACCESS STAIRWAY. An interior *stairway* that is not a required *interior exit stairway*.

64

HABITABLE SPACE. A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with *means of egress* and *ventilation* facilities meeting the requirements of this code.

65

EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exterior exit stairways* and *exterior exit ramps and horizontal exits*.

EXIT PASSAGEWAY. An *exit* component that is separated from other interior spaces of a building or structure by fire resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to an *exit* or to the *exit discharge*.

66

INTERIOR EXIT RAMP. An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and provides for a protected path of egress travel to the *exit discharge* or *public way*.

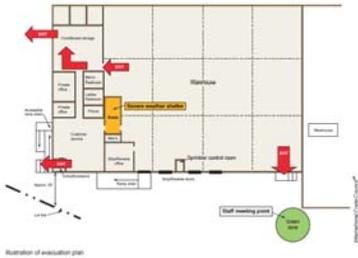
INTERIOR EXIT STAIRWAY. An *exit* component that serves to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance, and provides for protected path of egress travel to the *exit discharge* or *public way*.

67

EXIT DISCHARGE. That portion of a means of egress system between the termination of an exit and a public way.

It provides occupants with a path of travel away from the building. All components between the building and the public way are considered to be the exit discharge, regardless of the distance. In areas of sloping terrain, it is possible to have steps or stairs in the exit discharge leading to the public way. The exit discharge is part of the means of egress and, therefore, its components are subject to the requirements of the code

68



1001.4 Fire Safety and Evacuation Plans. Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the International Fire Code. Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the International Fire Code.

69

1004.4 Exiting From Multiple Levels. Where exits serve more than one floor, the occupant load of each floor considered individually shall be used in computing the required capacity of the exits at that floor, provided that the exit capacity shall not decrease in the direction of egress travel.

1004.5 Egress Convergence. Where means of egress from floors above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two floors.

1005.1 Minimum Required Egress Width. The means of egress width shall not be less than required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inch (7.62 mm) per occupant for stairways and by 0.2 inch (5.08 mm) per occupant for other egress components. The width shall not be less than specified elsewhere in this code. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

70

EXIT ENCLOSURE. An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a vertical or horizontal direction to the exit discharge or the public way.

TOAST!!!

71

EXIT. That portion of a means of egress system which is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel between the exit access and the exit discharge or public way. Exits components include exterior exit doors at the level of exit discharge, vertical exit enclosures interior exit stairways, interior exit ramps, exit passageways, exterior exit stairways, and exterior exit ramps and horizontal exits.

72

1005.3.1 Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.3 inches (7.62 mm) per occupant. Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.



Example: Assuming exit is serving 200 people

Component	Min width based on component (1005.2)	Min width based on occupant load (1005.3)
Corridor 'A'	44"	40"
Door 'B'	32"	30"
Stairway 'C'	44"	40"
Floor 'D'	32"	30"

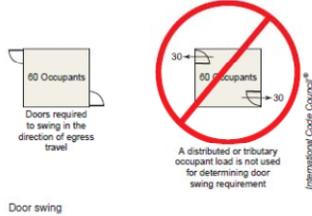
1. Building without sprinkler system or EVACS; also includes Group I1 and I2 occupancies.
 2. Other than Group H and I2 occupancies.
 Means of egress sizing

73

1008.1.2 Door Swing. Egress doors shall be of the pivoted or side-hinged swinging.

- **Exceptions:** (no changes to exceptions)

Doors shall swing in the direction of egress travel where serving a room or area containing an occupant load of 50 or more persons or a Group H occupancy.



Door swing

74

1008.1.9.8 Electromagnetically Locked Egress Doors. Doors in the means of egress that are not otherwise required to have panic hardware in buildings with an occupancy in Group A, B, E, M, R-1, or R-2 and doors to tenant spaces in Group A, B, E, M, R-1, or R-2 shall be permitted to be electromagnetically locked if equipped with listed hardware that incorporates a built-in switch and meet the requirements below:

1. The listed hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The listed hardware is capable of being operated with one hand.
3. Operation of the listed hardware directly releases through the panic to the electromagnetic lock and unlocks the door immediately.
4. Loss of power to the listed hardware automatically unlocks the door.
5. Where panic or fire exit hardware is required by Section 1008.1.10, operation of the listed panic or fire exit hardware also releases the electromagnetic lock.



75

1008.1.10 Panic and fire exit hardware. Doors serving a Group H occupancy and doors serving rooms or spaces with an occupant load of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock unless it is panic hardware or fire exit hardware.

- **Exception:** A main exit of a Group A occupancy in compliance with Section 1008.1.9.3, Item 2.

76



Interior exit stairway

Exit access stairway



77



Example of stairway that should be regulated by the code

1009.1 General. Stairways serving occupied portions of a building shall comply with the requirements of this section.

78

1011.2 Floor-Level Exit Signs in Group R-1. Where exit signs are required in Group R-1 occupancies by Section 1011.1, additional low-level exit signs shall be provided in all areas serving guest rooms in Group R-1 occupancies and shall comply with Section 1011.5. The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 12 inches (305 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side.

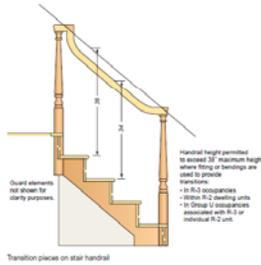


79

1012.2 Height. Handrail height, measured above stair tread nosings or finish surface of ramp slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height of alternating tread devices and ship ladders, measured above tread nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

- 1. When handrail fittings or bendings are used to provide continuous transition between flights the fittings or bendings shall be permitted to exceed the maximum height.
- 2. In Group R-3 occupancies, within dwelling units in Group R-2 occupancies, and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual dwelling units in Group R-2 occupancies, when handrail fittings or bendings are used to provide continuous transition between flights, transition at winder treads, transition from handrail to guard, or when used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.



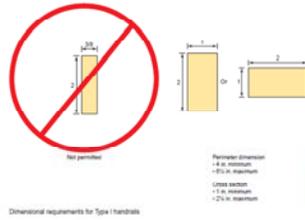
80

1012.3 Handrail Graspability. All required handrails shall comply with Section 1012.3.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies, within dwelling units in Group R-2 occupancies, and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies, handrails shall be **Type I** in accordance with Section 1012.3.1, **Type II** in accordance with Section 1012.3.2, or shall provide equivalent graspability.

81

1012.3.1 Type I. Handrails with a circular cross section shall have an outside diameter of at least 1 1/4 inches (32 mm) and not greater than 2 inches (51 mm). When the handrail is not circular, it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than 6 1/4 inches (160 mm) with a maximum cross-section dimension of 2 1/4 inches (57 mm) and **minimum cross-section dimension of 1 inch** (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).



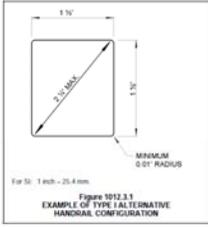


Figure 1012.3.1
EXAMPLE OF TYPE I ALTERNATIVE
HANDRAIL CONFIGURATION

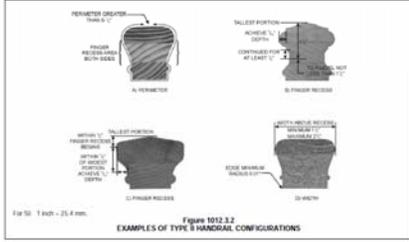


Figure 1012.3.2
EXAMPLES OF TYPE II HANDRAIL CONFIGURATIONS

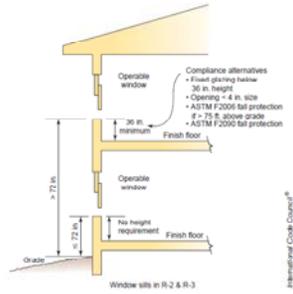
WINDOW GUARDS

1013.1 General. Guards shall comply with the provisions of Sections 1013.2 through 1013.7. Operable windows with sills located more than 72 inches (1.83 m) above finished grade or other surface below shall comply with Section 1013.8.

1013.8 Window Sills. In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than ~~24 inches (610 mm)~~ 36 inches (915 mm) above the finished floor surface of the room in which the window is located. ~~Glazing between the floor and a height of 24 inches (610 mm) shall be fixed or have openings through which a 4-inch (102-mm) diameter sphere cannot pass.~~ Operable sections of windows shall not permit openings that allow passage of a 4-inch (102-mm) diameter sphere where such openings are located within 36 inches (915 mm) of the finished floor.

Exceptions:

- 1. Openings that are Operable windows where the sill portion of the opening is located more than 75 feet (22.86 m) above the finished grade or other surface below and that are provided with window guards fall prevention devices that comply with ASTM F 2006 or F 2090.
- 2. Windows whose openings will not allow a 4-inch (102-mm) diameter sphere to pass through the opening when the window is in its largest opened position.
- 3. Openings that are provided with window fall prevention devices that comply with ASTM F2090.
- 4. Windows that are provided with window opening control devices that comply with Section 1013.8.



1013.8.1 Window Opening Control Devices. Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.

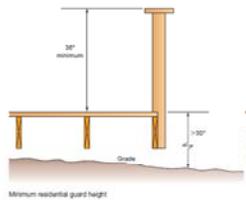


1013.3 Height. Required guards shall not be less than 42 inches (1067 mm) high, measured vertically above the as follows:

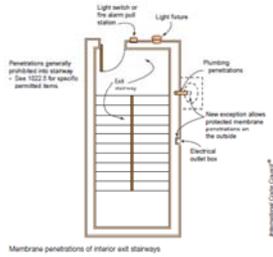
- 1. From the adjacent walking surfaces, adjacent fixed seating or
- 2. On stairs, from the line connecting the leading edges of the tread treads nosings, and
- 3. On ramps, from the ramp surface at the guard.

Exceptions:

- 1. For occupancies in Group R-3 not more than three stories above grade in height and within individual dwelling units in occupancies in Group R-2 not more than three stories above grade in height with separate means of egress, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces or adjacent fixed seating.

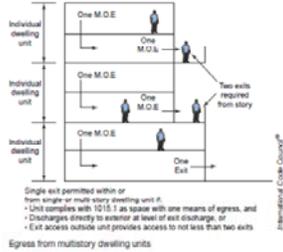


- ▶ **1022.5 Penetrations.** Penetrations into and openings through an exit enclosure **interior exit stairways and ramps** are prohibited except for required exit doors, equipment, and ductwork.....
- ▶ **Exception:** Membrane penetrations shall be permitted on the outside of the interior exit stairway and ramp. Such penetrations shall be protected in accordance with Section 714.3.2.



1021.2 Exits from Stories. Two exits, or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be provided where one of the following conditions exists:

- ▶ 1. The occupant load or number of dwelling units exceeds one of the values in Table 1021.2(1) or 1021.2(2).
- ▶ 2. The exit access travel distance exceeds that specified in Table 1021.2(1) or 1021.2(2) as determined in accordance with the provisions of Section 1016.1.
- ▶ 3. Helistop landing areas located on buildings or structures shall be provided with two exits, or exit access stairways or ramps providing access to exits.
- ▶ **Exceptions:**
 - ▶ 1. Rooms, areas and spaces complying with Section 1015.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit.



THE END

For Today
