



Means of Egress Construction

3 components to an egress system:

- 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 - 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 and ramps, exit passageways, exterior exit stairways and ramps and horizontal exits.
- Exit discharge - That portion of a means of egress system between the termination of an exit and a public way.

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Means of Egress Construction

Rating requirements are based:

- On Occupancy use group;
- If building is sprinklered;
- Occupant load

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Means of Egress Construction

Exit access can be:

- Stairways
- Ramps
- Corridors

Exits can be:

- Interior or Exterior Stairs;
- Ramps;
- Passageways

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Means of Egress Construction Exit Access

Corridor ratings based on:

- Occupancy;
- Occupant Load;
- Sprinklered or non-sprinklered

(IBC) TABLE 1009.1
CORRIDOR FIRE-RESISTANCE RATING

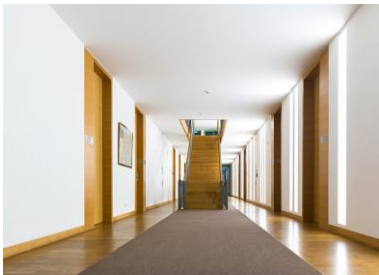
OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system ^a
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 50	Not Permitted	1
A, B, E, F, M, S, U	Greater than 50	1	0
R	Greater than 10	Not Permitted	0.5
I-2 ^b , I-4	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1 ^c

^a For requirements for occupancies in Group I-2, see Section 407.2 and 407.3 of the International Building Code.
^b For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.
^c Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.2.2 where allowed.

Means of Egress Construction Exit Access



Means of Egress Construction Exit Access



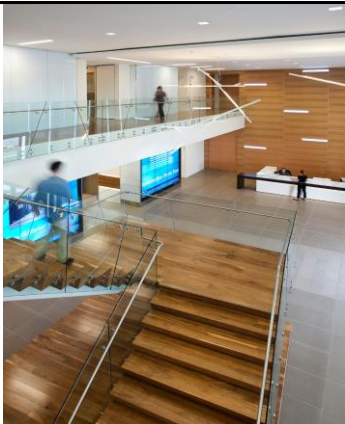


Means of Egress Construction Exit Access

- Stairways and ramps per 1019.3 (AMD);
- 10 exceptions;
- #1 stairs that serve or atmospherically communicate between only two stories.
- No shaft enclosure rating required
- "Convenience stair"



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Means of Egress Construction Exit Stairs



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Means of Egress Construction Exit Stairs

Once a level of exit protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge;

Enclosures shall be constructed as fire barriers in accordance with Section 707 or Section 711, or both.

Interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories.

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Means of Egress Construction Exit Stairs



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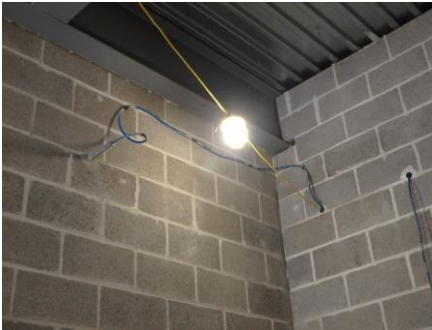
Means of Egress Construction Exit Stairs



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**Means of Egress Construction
Exit Stairs**



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**Means of Egress Construction
Exit Stairs**



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**Means of Egress Construction
Exit Stairs**



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**Means of Egress Construction
Exit Stairs**



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**Means of Egress Construction
Exit Stairs**



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**Means of Egress Construction
Exit Stairs**



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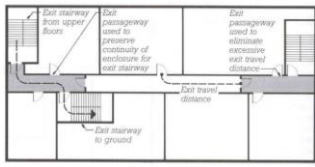
Means of Egress Construction Exit Stairs



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Means of Egress Construction Exits

Exit Passageway



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Means of Egress Construction Exit Passageways

Enclosures shall have walls, floors and ceilings of not less than a 1-hour fire-resistance rating, and not less than that required for any connecting interior exit stairway or ramp;
Opening protectives shall be in accordance with the requirements of Section 716;
Penetrations into or through an exit passageway are prohibited except:

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**Means of Egress Construction
Exit Passageways**



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**Means of Egress Construction
Exit Passageways**



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**Means of Egress Construction
Exit Passageways**



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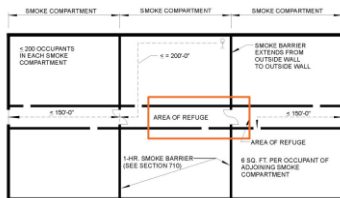
Means of Egress Construction Exit Passageways



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Means of Egress Construction Horizontal Exits

Horizontal Exit



36 | Decoded 3 - Egress and Life Safety

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Means of Egress Construction Horizontal Exits

- Can be used to separate areas;
- Can be used for building separations;

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**Means of Egress Construction
Horizontal Exits**



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**Means of Egress Construction
Horizontal Exits**



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**Means of Egress Construction
Horizontal Exits**



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**Means of Egress Construction
Horizontal Exits**



**Means of Egress Construction
Horizontal Exits**



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**Means of Egress Construction
Horizontal Exits**



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**Means of Egress Construction
Horizontal Exits**



**Means of Egress Construction
Horizontal Exits**



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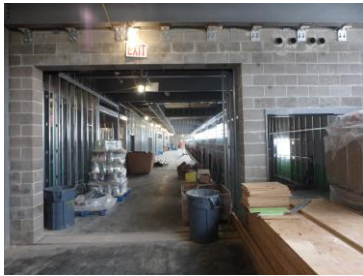
**Means of Egress Construction
Horizontal Exits**



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Means of Egress Construction Horizontal Exits



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Means of Egress Construction

707.5 Continuity. Fire barriers shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such fire barriers shall be continuous through concealed space, such as the space above a suspended ceiling. Joints and voids at intersections shall comply with Sections 707.8 and 707.9

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Means of Egress Construction

Construction not limited to wall penetrations or separations;
Includes opening protectives

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Means of Egress Construction



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Additional Resources

- For fire stopping verification:
 - www.hilti.com/firestops
- For UL listing:
 - <http://productspec.ul.com/>

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Mixed Occupancies



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Mixed Occupancies

ICC definitions:

Nonseparated:

- 508.3 Nonseparated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.
- 508.3.1 Occupancy classification. Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area. Where nonseparated occupancies occur in a high-rise building, the most restrictive requirements of Section 403 that apply to the nonseparated occupancies shall apply throughout the high-rise building.

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Mixed Occupancies

ICC definitions:

Separated:

- 508.4 Separated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.
- 508.4.4 Separation. Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.
 - 508.4.4.1 Construction. Required separations shall be fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

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Mixed Occupancies

For **NEW** construction

IFC addresses

- Single means of egress 1006.3.2.1

Separated and Nonseparated are IBC driven

- Section 508
- Section 510
- Section 707.3.9
- Section 7.11.2.4
- Chapter 9

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Mixed Occupancies

**TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)**

OCCUPANCY	A, E		I-1, I-1.1, I-4		I-2		R ^a		F-2, S-2 ^b , U		B ^c , F-1, M, S-1		H-1	H-2		H-3, H-4		H-5		
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	NP
I-1 ^d , I-3, I-4	—	—	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP
I-2	—	—	—	—	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP
R ^a	—	—	—	—	—	—	N	N	1 ^e	2 ^e	1	2	NP	NP	3	NP	2	NP	2	NP
F-2, S-2 ^b , U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3	2	NP
B ^c , F-1, M, S-1	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP	
H-1	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP	NP	NP	NP	NP	
H-2	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP	1	NP	1	NP		
H-3, H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	1 ^f	NP	1	NP	1	NP	
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP			

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
 N = No separation requirement.
 NP = Not permitted.
 a. See Section 420.
 b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but not to less than 1 hour.
 c. See Section 406.3.4.
 d. Separation is not required between occupancies of the same classification.
 e. See Section 422.2 for ambulatory care facilities.
 f. See Section 422.2 for ambulatory care facilities.

Mixed Occupancies

For existing occupancies use Part IV NFPA 101

NFPA definitions

- 6.1.14.2.1 Multiple Occupancy. A building or structure in which two or more classes of occupancy exist.
- 6.1.14.2.2 Mixed Occupancy. A multiple occupancy where the occupancies are intermingled.
- 6.1.14.2.3 Separated Occupancy. A multiple occupancy where the occupancies are separated by fire resistance-rated assemblies.

Mixed Occupancies

6.1.14 Multiple Occupancies

- Amended
- Removed section 6.1.14.4 Separated Occupancies

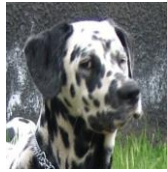
6.1.14.3.2* The building shall comply with the most restrictive requirements of the occupancies involved, unless separate safeguards are approved.

Separation requirements were always Building Code (BOCA)



Mixed Occupancies

- So what to do if it is existing?????



- Well.....

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Mixed Occupancies

FIRE RESISTIVE CONSTRUCTION REQUIREMENTS

TABLE 16- FIRE GRADING OF USE GROUPS

Class	Use group	Fire grading in hours
A	High hazard	4
B-1	Storage-Moderate hazard	3
B-2	Storage-Low hazard	2
C	Merchandise	3
D	Industrial	3
E	Business	2
F-1	Assembly-Theaters	3
F-2	Assembly-night clubs	3
F-3	Assembly-recreation centers, lecture halls, terminals, restaurants	2
F-4	Assembly-Churches, schools	1½
H-1	Institutional-Restrained occupants	3
H-2	Institutional-Nonrestrained occupants	2
L-1	Residential-Hotel	2
L-2	Residential-Multi-family dwellings	1½
L-3	Residential-1 and 2 family dwellings	1

Table 1402
FIRE GRADING OF USE GROUPS

Use group	Fire grading in hours	
A-1	Assembly, theaters	3
A-2	Assembly, night clubs	3
A-3	Assembly, recreation centers, lecture halls, terminals, restaurants	2
A-4	Assembly, churches	1½
B	Business	2
E	Educational	1½
F	Factory and industrial	3
H	High hazard	4
I-1	Institutional, residential care	1
I-2	Institutional, nonrestrained	2
I-3	Institutional, restrained	3
M	Mercantile	2
R-1	Residential, hotels	2
R-2	Residential, multi-family dwellings	1½
R-3	Residential, 1 and 2 family dwellings	1
S-1	Storage, moderate hazard	3
S-2	Storage, low hazard	2

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Mixed Occupancies

Table 902
FIRE GRADING OF USE GROUPS

Use Group	Fire grading in hours	
A-1	Assembly, theaters	3
A-2	Assembly, night clubs	3
A-3	Assembly, recreation centers, lecture halls, terminals, restaurants	2
A-4	Assembly, churches	1½
B	Business	2
E	Educational	1½
F	Factory and industrial	3
H	High hazard	4
I-1	Institutional, residential care	1
I-2	Institutional, nonrestrained	2
I-3	Institutional, restrained	3
M	Mercantile	2
R-1	Residential, hotels	2
R-2	Residential, multi-family dwellings	1½
R-3	Residential, 1 and 2 family dwellings	1
S-1	Storage, moderate hazard	3
S-2	Storage, low hazard	2

THE NEW YORK STATE FIRE DEPARTMENT

Use Group	Table 902.1 FIRE GRADING OF USE GROUPS	Table 902.2 FIRE GRADING OF USE GROUPS
A-1	3	3
A-2	3	3
A-3	2	2
A-4	1½	1½
B	2	2
E	1½	1½
F	3	3
H	4	4
I-1	1	1
I-2	2	2
I-3	3	3
M	2	2
R-1	2	2
R-2	1½	1½
R-3	1	1
S-1	3	3
S-2	2	2

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Mixed Occupancies

Use Group	A-1	A-2	A-3	A-4	A-5	B	E	F-1	F-2	H-1	H-2	H-3	H-4	L-1	L-2	I-3	M	R-1	R-2	R-3	S-1	S-2	UP	
A-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
A-2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
A-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
A-4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
A-5																								
B	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
E	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
F-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
F-2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
H-1																								
H-2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
H-3																								
H-4																								
L-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
L-2																								
I-3																								
M	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
R-1																								
R-2																								
R-3																								
S-1																								
S-2																								
UP																								3

Note a. Fire-resistance ratings are expressed in hours.
 Note b. For requirements for private garages, see Section 407.0.

Mixed Occupancies

Use Group	TABLE 913.1.2 FIRE RESISTANCE RATING REQUIREMENTS FOR FIRE SEPARATION ASSEMBLIES BETWEEN FIRE AREAS*																									UP
	A-1	A-2	A-3	A-4	A-5	B	E	F-1	F-2	H-1	H-2	H-3	H-4	L-1	L-2	I-3	M	R-1	R-2	R-3	S-1	S-2	UP			
A-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
A-2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
A-3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
A-4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
A-5																										
B	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
E	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
F-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
F-2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
H-1																										
H-2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
H-3																										
H-4																										
L-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
L-2																										
I-3																										
M	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
R-1																										
R-2																										
R-3																										
S-1																										
S-2																										
UP																									3	

Note a. Fire-resistance ratings are expressed in hours.
 Note b. For requirements for private garages, see Section 407.0.

Mixed Occupancies

Answer would be:

- FPC: (Amd) 4.5.8.1 Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, fire resistive construction, or any other feature is required for compliance with the provisions of this code, the CSFSC or the SBC, such device, equipment, system, condition, arrangement, level of protection or other feature shall thereafter be continuously maintained in accordance with applicable NFPA requirements.

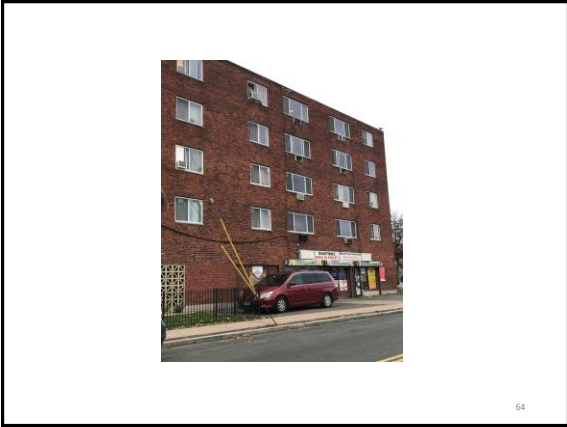








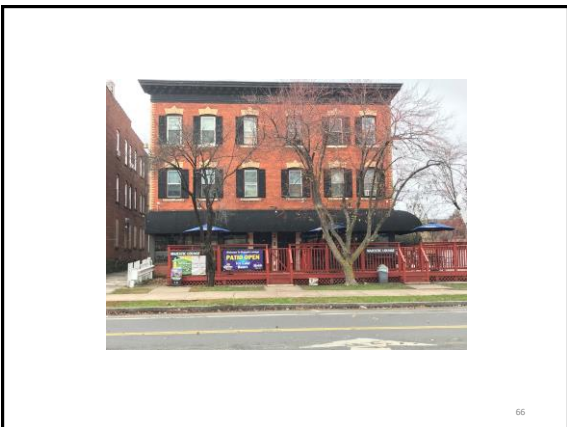




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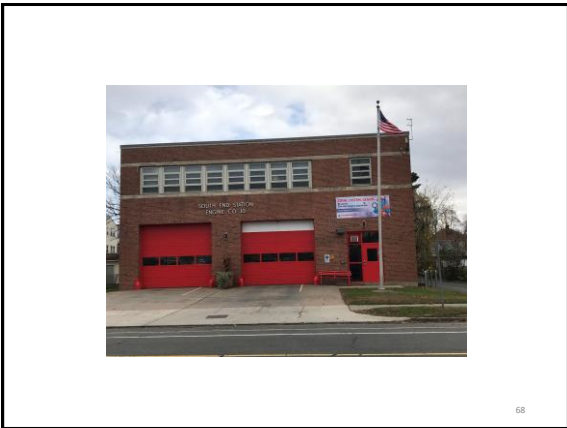


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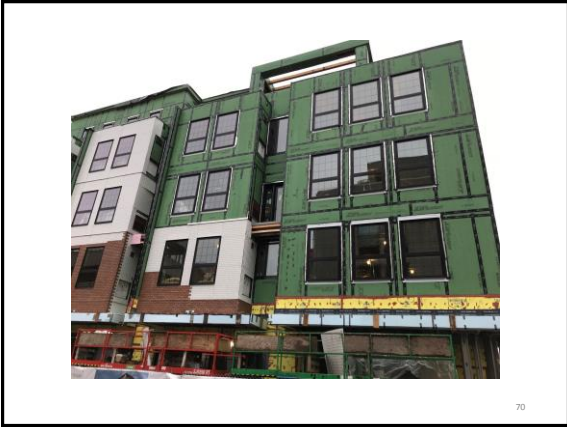


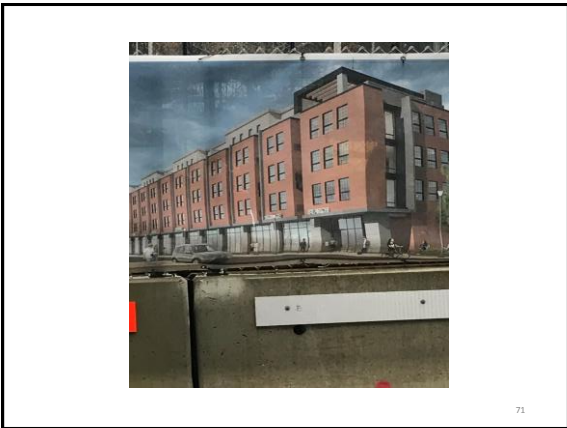
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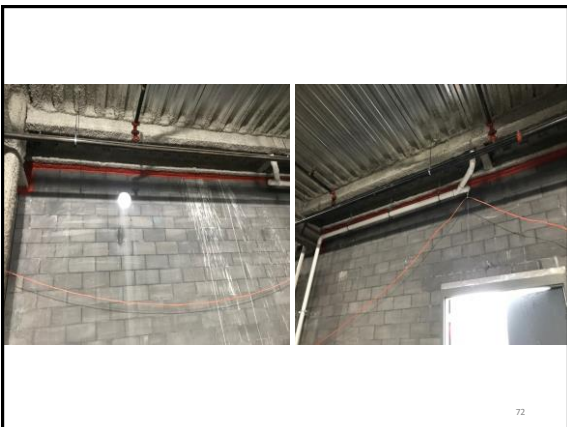


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Signage Requirements

Used to identify:

- Fire Protection systems
- Damper access
- Photovoltaic Systems
- Wall ratings
- Stairwells
- Shaftways

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Sprinklers

Sprinkler test and control valves

Drains

Fire Department Connections

What and Where

System demand if over 150 psi

Hydraulic Design

Table A6.10 NFPA 13 2013 edition

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13-282 INSTALLATION OF SPRINKLER SYSTEMS

Table A.6.10 Sprinkler System Signage Summary

Section	Sign Location	Sign Information/Requirements
6.7.4	Control valves Drain valves Test connection valves	Identification sign Signs must be made of weatherproof metal or rigid plastic and attached with corrosion-resistant wire or chain.
7.6.1.4 and 7.6.1.5	Antifreeze system main valve Circulating closed loop system	Indicate the following: Antifreeze manufacturer Antifreeze type Antifreeze concentration
7.7.1.5	All valves controlling sprinklers	Signs worded as follows: "This valve controls fire protection equipment. Do not close until after fire has been extinguished. Use auxiliary valves when necessary to shut off supply to auxiliary equipment. Caution: Automatic alarm may be sounded if this valve is closed."
8.16.1.1.8	Control valves	Indicate valve function Indicate system being controlled
8.16.2.5.3.7	Dry valve Preaction valve	Number of low point drains Location of each drain
8.17.2.4.5	Fire department connections not serving the whole building	Indicate portion of the building served by the fire department connection

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8.17.2.4.7	All fire department connections	Indicate systems served by the fire department connection Indicate system pressure demand (for systems requiring more than 150 psi) Letters must be 1 in. in height
24.5	Alarm valve Dry pipe valve Preaction valve Deluge valve	Indicate the following: Location of the design area or areas Discharge densities over the design area or areas Required flow and residual pressure demand at the base of the riser Occupancy classification or commodity classification and maximum permitted storage height and configuration Hose stream allowance The installing contractor Signs must be made of weatherproof metal or rigid plastic and attached with corrosion-resistant wire or chain
24.6	System control riser Antifreeze loops Auxiliary systems Control valves	Indicate the following: Name and location of the facility Occupancy and commodity classification Flow test data Original main drain flow test results Presence of uncapaculated pallet loads Presence of solid shelving Presence of flammable/combustible liquids Presence of hazardous materials

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Table A.6.10 Continued

Section	Sign Location	Sign Information/Requirements
		Presence of other special storage Presence of antitremors or other auxiliary systems Maximum storage height Aisle width Location of auxiliary drains and low point drains on dry pipe and preaction systems Installing contractor or designer Sign must be made of weatherproof metal or rigid plastic and attached with corrosion-resistant wire or chain
36.2.7.5	Fire department connection (FDC)	18 in. x 18 in. sign FDC symbol from NFPA 170 Located at connection in plain sight from shore access point
A.18.17.1	Central station, auxiliary, remote station, or proprietary protective signaling system	Recommended: Located near the device Direct people to call police or fire department when bell rings

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Standpipes

- Control valves
- Drains
- Fire Department Connections
- What and Where
- Hydraulic Design
- Chapter 6 has several sections

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Part III IFC

- Some identical to IBC and same language in FPC
- Shaftways - 316.2
- Nonfunctioning exterior doors - 504.2
- Access to roofs - 504.3
- Fire Protection and Utility Rooms - 509.1
- Photovoltaic Systems - 605.11

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Part III IFC

- Refrigerator Units - 606.7
- Battery Rooms - 608
- Opening Protectives
 - Fire doors
- Clean Agent warning - 904.3.4
- Fire Alarm activation - 907.2.4

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Part III IFC

- 1004.3 - Occupant load posting
- Area of Refuge - 1009.9
- Stairways greater than 3 stories - 1023.9
- Marking of non exit door - 1031.5

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Part III IBC

Same as IFC and:

- Live Loads - 106.1
- Emergency Responder Safety Features - 914
- Accessible Signage - 1111 (Amd)
- Interior Signage - 1111.5 (Added)
- Pictorial Sign at Elevators - 3002.3

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Part IV NFPA

Several sections in Chapter 7

- 7.2.1.4.1 (3)(b) - horizontal sliding or vertical-rolling security grilles or door assemblies sign that reads **THIS DOOR TO REMAIN OPEN WHEN THE SPACE IS OCCUPIED.**
- 7.2.1.5.5 (2) - Exterior door assemblies with key locks sign that reads **THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED.**
- 7.2.1.6.1.1 (4)(a) & (b) - Delayed Egress Locking Systems
 - (a) **PUSH UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN 15 SECONDS,** for doors that swing in the direction of egress travel
 - (b) **PULL UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN 15 SECONDS,** for doors that swing against the direction of egress travel

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Part IV NFPA

- 7.2.1.6.2(3)(b) - Access Control Egress Door
 - (b) The manual release device shall be readily accessible and clearly identified by a sign that reads as follows: **PUSH TO EXIT.**
- 7.2.1.9.3 - Swinging Power Leaf Door a sign to read **IN EMERGENCY, PUSH TO OPEN**
- 7.2.1.9.4 - Sliding Power Leaf Door a sign to read **IN EMERGENCY, SLIDE TO OPEN**

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Part IV NFPA

- 7.10.8.3 - Any door, passage, or stairway that is neither an exit nor a way of exit access and that is located or arranged so that it is likely to be mistaken for an exit shall be identified by a sign that reads as follows:

**NO
EXIT**

- 8.5.5.5 - Access and identification of smoke dampers
- 13.7.9.3.2 - Occupant Load Posting

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Fire Prevention Code

- Several sections
- Chapter 10.11
 - Premises identification
 - Shaftways
 - Stairwells
- Chapter 11.12
 - Photovoltaic Systems
- Chapter 12.9.5.5 Access and identification of smoke dampers
- Chapter 14.14.8.3 No Exit
- Other Occupancies or Processes
 - No Smoking
 - Hazardous materials/areas

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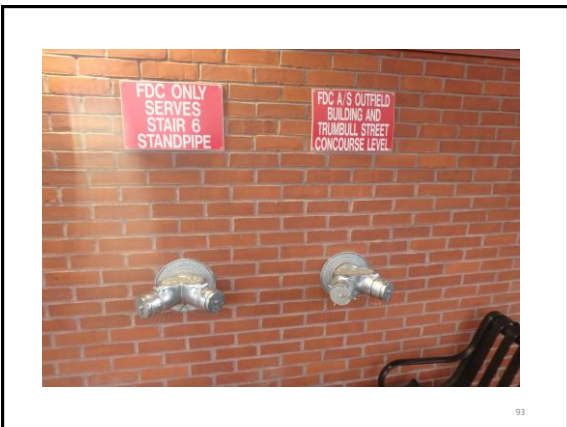
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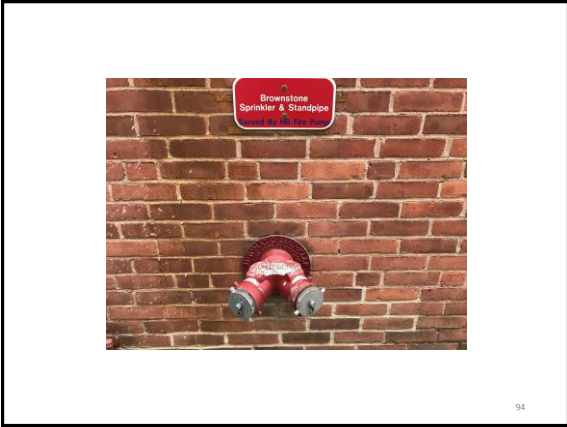
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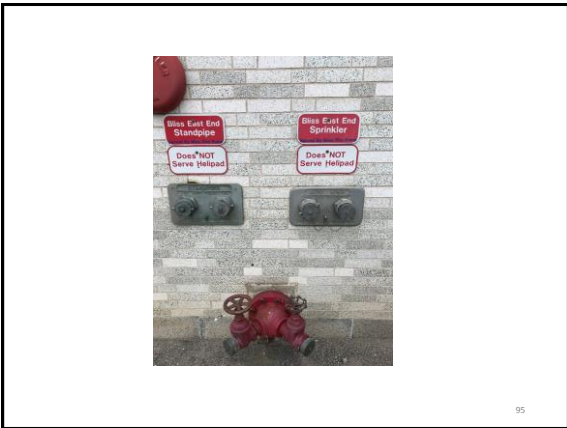




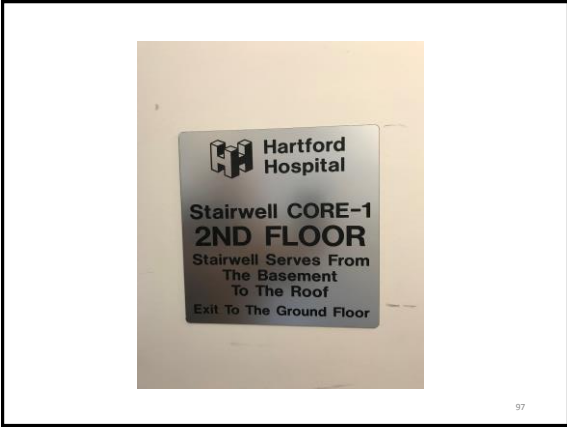






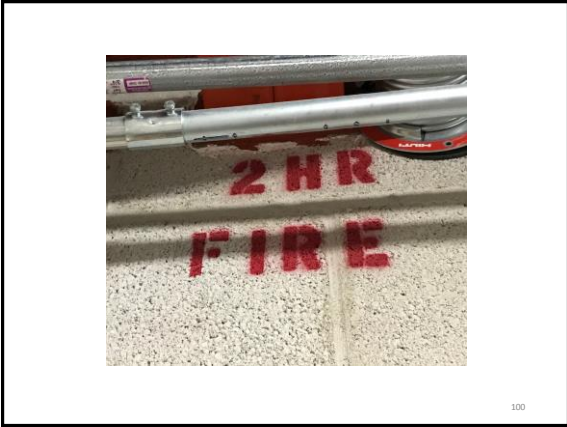














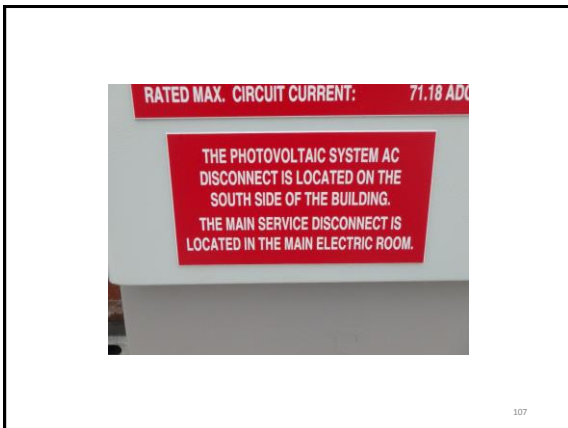


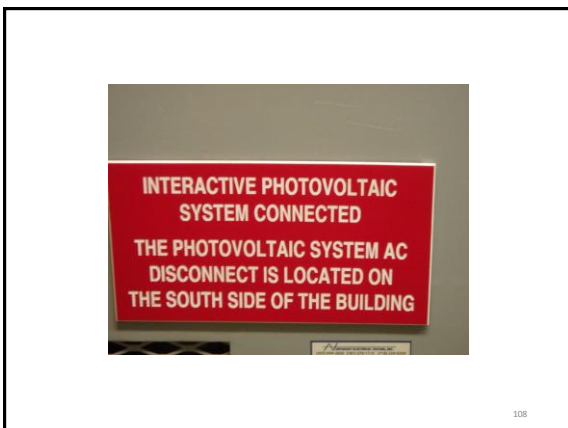










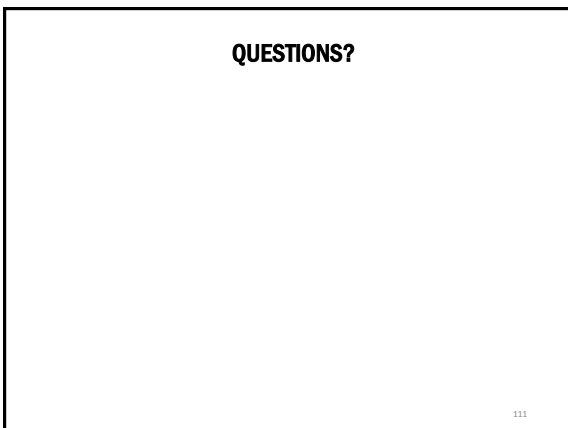




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Use of OEDM Training Materials

Use of Office of Education and Data Management (OEDM) training materials must be approved in writing by the State of Connecticut, Department of Administrative Services' Office of Communications. In approving of such use, the State of Connecticut assumes no liability associated with such use, including, but not limited to, the user's dissemination of any inaccurate information or interpretation in connection with its use of these training materials. Use of the training materials is at the sole risk of the user, and the State's approval of the use does not constitute an endorsement of the user or its intended use.

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