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Code Requirements for Fire Rated Doors and Hardware

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Code Requirements for Fire Rated Doors and Hardware

Presented By: Total Door®
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Description: Provides an overview of the 2006 International Building Code requirements for fire rated door assemblies, including door and hardware, framing systems, and core materials to ensure safe environments in the event of a building fire.

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Learning Objectives

Upon completing this course, you will be able to:

- identify the sections of the IBC-2006 that pertain to the many aspects of the fire door assembly as related to swinging fire/smoke doors and hardware and apply them to building design
- recognize the changes to the IBC-2006 for fire rated doors and hardware in areas such as positive pressure, temperature rise, and tight fitting smoke and draft assembly
- describe the many applications in which fire door assemblies may be involved, and
- evaluate the design options that comply with the building code requirements for fire door assembly and utilize the most suitable option.

Introduction

This course is a general review of the fire codes that relate to fire doors and hardware and references IBC 2006 codes, NFPA (National Fire Protection Association), and ADA (American Disabilities Act) and is not an exhaustive or comprehensive study of each code and/or exceptions in the codes that may apply.

Introduction

IBC 2006

The IBC-2006 (International Building Code) contains changes to the requirements for fire rated doors and hardware. Specifically, changes were made as they relate to positive pressure testing, temperature rise, and tight fitting smoke and draft assemblies.

In this course, we will review those changes made to the IBC-2006 and provide a general overview of other fire code requirements pertaining to swinging fire and smoke doors, as well as hardware assemblies.

The course begins with a review of the terminology commonly used in the industry, followed by the reciting of the occupancy classifications to develop a better understanding of the nature of the IBC-2006.

Definitions

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.

Exit, Horizontal:

A path of egress travel from one building to an area in another building on approximately the same level, or a path of egress travel through or around a wall or partition to an area on approximately the same level in the same building, which affords safety from fire and smoke from the area of incidence and areas communicating therewith.

Definitions

Exit Passageway:

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

Fire Barrier:

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

Fire Door:

The door component of a fire door assembly.

Definitions

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.

Fire Door Hardware:

Panic hardware that is listed for use on fire door assemblies.

Fire Partition:

A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

Fire Protection Rating:

The period of time that an opening protective assembly will maintain the ability to confine a fire as determined by tests prescribed in IBC 2006 - Section 715. Ratings are stated in hours or minutes.

Definitions

Fire-Resistance Rating:

The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in IBC 2006 - Section 703.

Fire Wall:

A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to, or through, the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

Self-Closing:

As applied to a fire door or other opening, means equipped with an approved device that will ensure closing after having been opened.

Definitions

Smoke Barrier:

A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke.

Smoke Compartment:

A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

Shaft:

An enclosed space extending through one or more stories of a building, connecting vertical openings in successive floors, or floors and roof.

Shaft Enclosure:

The walls or construction forming the boundaries of a shaft.

Use and Occupancy Classifications

Assembly / Business

1. **Assembly** (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5

   303.1 Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption; or awaiting transportation.

2. **Business** (see Section 304): Group B

   304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts.

Use and Occupancy Classifications

Educational

3. **Educational** (see Section 305): Group E

305.1 Educational Group E. Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade. Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with Section 508.3.1 and have occupant loads of less than 100, shall be classified as A-3 occupancies.

Use and Occupancy Classifications

Factory and Industrial

4. **Factory and Industrial** (see Section 306): Groups F-1 and F-2

306.1 Factory Industrial Group F. Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

306.2 Factory Industrial F-1 Moderate-hazard Occupancy. Factory industrial uses which are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard.

306.3 Factory Industrial F-2 Low-hazard Occupancy. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials which during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies.

Use and Occupancy Classifications

High Hazard

5. **High Hazard** (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5

   [F] 307.1 High-hazard Group H. High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas constructed and located as required in Section 414. Hazardous uses are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this section, the requirements of Section 415 and the International Fire Code.

Use and Occupancy Classifications

Institutional

6. **Institutional** (see Section 308) occupancies: classified as Group I-1, I-2, I-3 or I-4.

308.1 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which people are cared for or live in a supervised environment, having physical limitations because of health or age, are harbored for medical treatment or other care or treatment, or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted.

308.2 Group I-1. This occupancy shall include buildings, structures or parts thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff.

Use and Occupancy Classifications

Institutional cont'd…

308.3 Group I-2. This occupancy shall include buildings and structures used for medical, surgical, psychiatric, nursing or custodial care on a 24-hour basis for more than five persons who are not capable of self-preservation.

308.4 Group I-3. This occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. A I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control.

Use and Occupancy Classifications

Institutional cont'd…

308.5 Group I-4, day care facilities. This group shall include buildings and structures occupied by persons of any age who receive custodial care for less than 24 hours by individuals other than parents or guardians, relatives by blood, marriage or adoption, and in a place other than the home of the person cared for. A facility such as the above with five or fewer persons shall be classified as a Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2. Places of worship during religious functions are not included.

Use and Occupancy Classifications

Mercantile / Residential

7. **Mercantile** (see Section 309): Group M

   309.1 Mercantile Group M. Mercantile Group M occupancy includes, among others, buildings and structures or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public.

8. **Residential** (see Section 310): Groups R-1, R-2, R-3 and R-4

   310.1 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code in accordance with Section 101.2.

Use and Occupancy Classifications

Storage / Utility and Miscellaneous

9. **Storage** (see Section 311): Groups S-1 and S-2

311.1 Storage Group S. Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

311.2 Moderate-hazard storage, Group S-1.

311.3 Low-hazard storage, Group S-2.

10. **Utility and Miscellaneous** (see Section 312): Group U

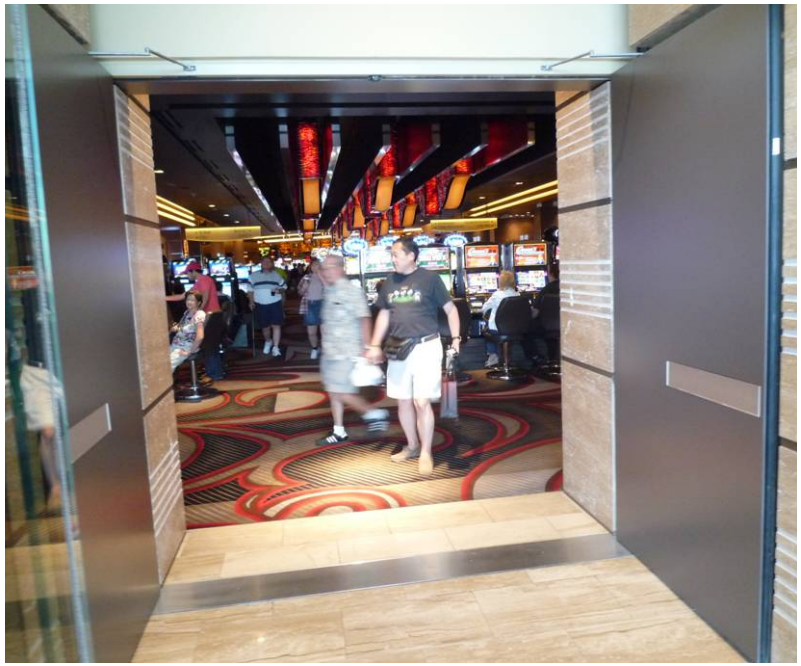
312.1 General. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy.

Fire Code Overview

Introduction

In this section of the course, a discussion of the following topics relating to the fire codes is presented:

- positive pressure testing
- self-closing and self-latching fire doors
- labeling requirements
- temperature rise
- door hardware
- exit doors / glazing material
- undercuts / clearances
- size of doors
- door opening force
- elevator lobbies and shafts
- corridor and smoke barriers



Fire Code Overview

Positive Pressure Testing

Positive Pressure is a new type of fire testing for doors and hardware that is now being adopted in the U.S market.

Positive Pressure testing is to determine if the test door can withstand the higher pressures above the 40" neutral pressure plane that are created inside the test chamber during the entirety of the test.

The main benefit of using the Positive Pressure test over other fire door testing methods is that the Positive Pressure test more closely replicates what takes place in real fire conditions.

Fire Code Overview

Positive Pressure Testing cont'd…

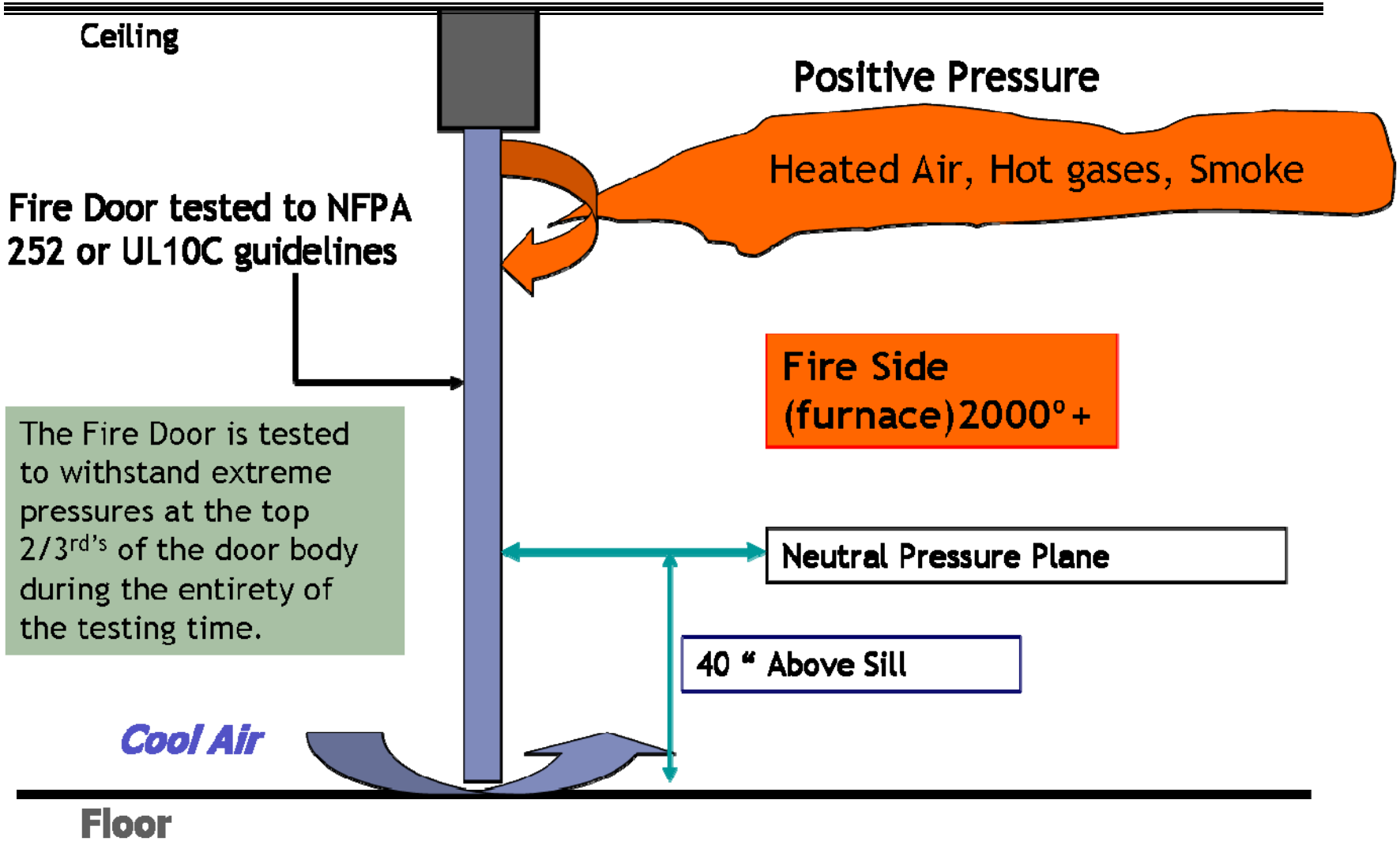
Fire door assemblies must be positive pressure tested according to UL 10C or NFPA 252 guidelines.

SECTION 715 OPENING PROTECTIVES

715.4.1 Side-hinged or pivoted swinging doors. Side-hinged and pivoted swinging doors shall be tested in accordance with NFPA 252 or UL 10C. After 5 minutes into the NFPA 252 test, the neutral pressure level in the furnace shall be established at 40 inches (1016 mm) or less above the sill.

A "positive pressure" label applied to the door becomes an "assembly" label as opposed to simply a door body label.

Positive Pressure / Smoke Test



Fire Code Overview

Self-Closing and Self-Latching Fire Doors

Fire doors must be self-closing and self-latching in order to meet the IBC-2006. Section 710 and 715 of the Building Code will be explored in further detail in the following slides.

SECTION 710 SMOKE PARTITIONS

710.5.3 Self- or automatic-closing doors. Where required elsewhere in the code, doors in smoke partitions shall be self- or automatic-closing by smoke detection in accordance with Section 715.4.7.3.

Fire Code Overview

Self-Closing and Self-Latching Fire Doors cont'd…

Self-closing means equipped with an approved device that will ensure closing after having been opened.

Example: If the door is held open by an approved magnetic holder, when fire or smoke detection is activated, the magnetic holder releases the door and an approved device pushes the door to the closed position and the door self-latches.

Fire Code Overview

Labeling Requirements

Fire Door assemblies must be labeled by an approved agency and the label must be factory applied to the fire door. Fire door labels are usually attached on the hinge edge of the fire door, but can be attached on the top edge of the door assembly.

SECTION 715 OPENING PROTECTIVES

715.4.5 Labeled protective assemblies. Fire door assemblies shall be labeled by an approved agency. The labels shall comply with NFPA 80, and shall be permanently affixed to the door or frame.

715.4.5.1 Fire door labeling requirements. Fire doors shall be labeled showing the name of the manufacturer, the name of the third-party inspection agency, the fire protection rating and, where required for fire doors in exit enclosures and exit passageways by Section 715.4.4, the maximum transmitted temperature end point. Smoke and draft control doors complying with UL 1784 shall be labeled as such. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

Fire Code Overview

Labeling Requirements cont'd…

An "S" indication on the fire label means that the Fire Door assembly has been tested in accordance with the Air Leakage test and is acceptable for use in Smoke Partition, Smoke Barrier and Smoke Enclosure applications.

The Air Leakage test investigates the air leakage condition through door assemblies installed in wall openings where air leakage is intended to be controlled, such as Smoke Barriers, Smoke Partitions, and Shaft Enclosures. Installation and use is in accordance with the NFPA Recommended Practice for the Installation of Smoke- and Draft-Control Door Assemblies, NFPA 105.

The purpose of the test is not for fire control but to determine only the resistance of a door assembly, in the closed position, to air leakage resulting from a specified air pressure difference applied across the surface of the entire door assembly. These requirements apply to complete door assemblies or to gasketing systems intended for use with specific door assemblies.

Fire Code Overview

Labeling Requirements cont'd…

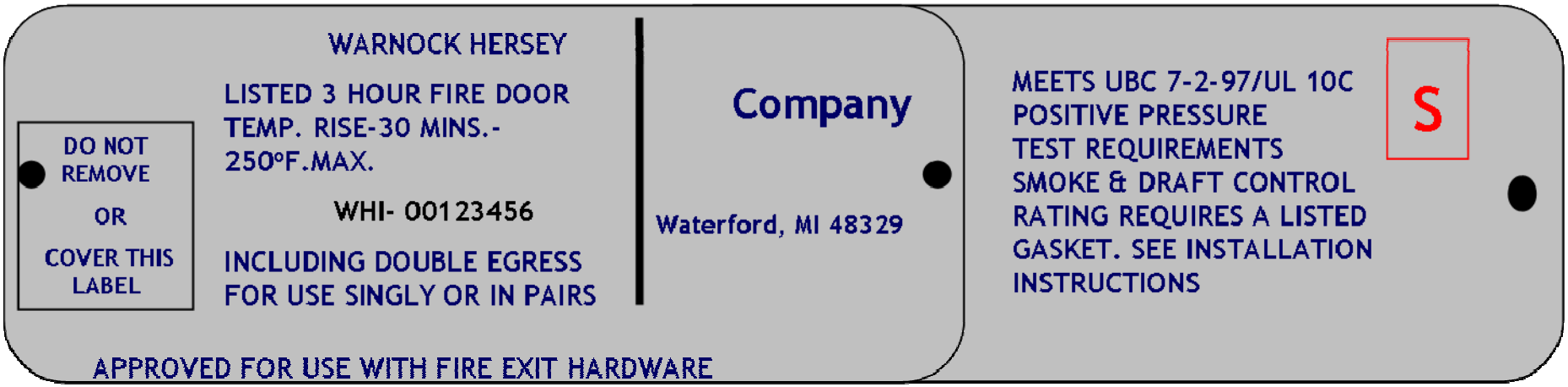
SECTION 715 OPENING PROTECTIVES

715.4.5.3 Smoke and draft control door labeling requirements. Smoke and draft control doors complying with UL 1784 shall be labeled in accordance with Section 715.4.5.1 and shall show the letter **"S"** on the fire rating label of the door. This marking shall indicate that the door and frame assembly are in compliance when listed or labeled gasketing is also installed.

Fire Code Overview

Labeling Requirements cont'd…

Below is an example of a typical label used on a Fire Door Assembly.



Fire Code Overview

Labeling Requirements cont'd…

SECTION 715 OPENING PROTECTIVES

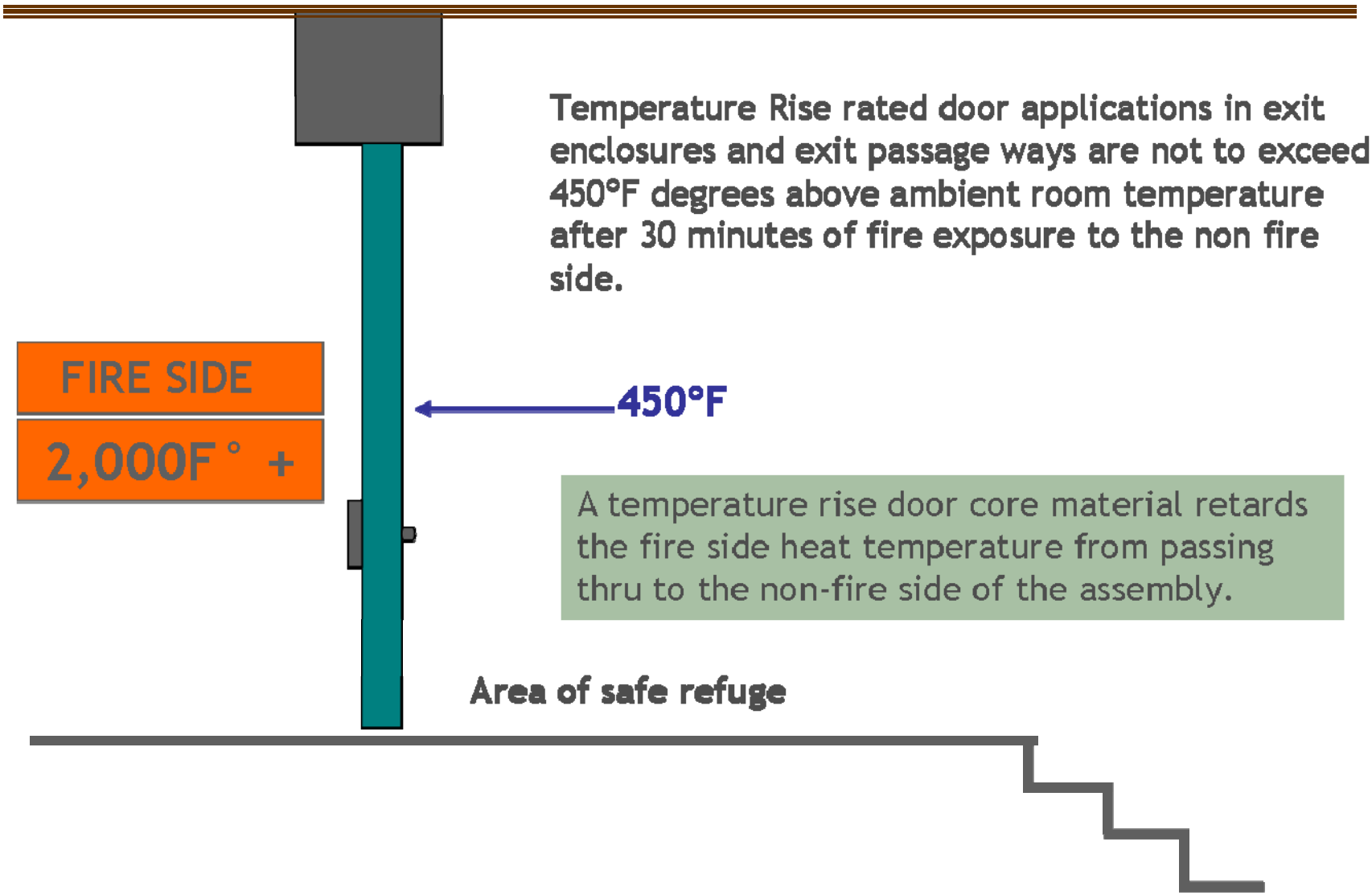
715.4.5.2 Oversized doors. Oversized fire doors shall bear an oversized fire door label by an approved agency or shall be provided with a certificate of inspection furnished by an approved testing agency. When a certificate of inspection is furnished by an approved testing agency, the certificate shall state that the door conforms to the requirements of design, materials and construction, but has not been subjected to the fire test.

IBC 2006 Section 1008.1.1 Means of Egress

The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal.

Oversized fire doors: Door leafs over 48" in width must bear a certificate of inspection or a "hard label" approved by the testing agency. A hard label is sometimes referred to as a Construction Label which indicates that the door design, material and construction used to manufacture the door are in compliance with the same construction as a fire tested door.

Temperature Rise Door



Temperature Rise Door cont'd…

Exit Stair Enclosures

SECTION 715 OPENING PROTECTIVES

715.4.4 Doors in exit enclosures and exit passageways. Fire door assemblies in exit enclosures and exit passageways shall have a maximum transmitted temperature end point of not more than 450°F (250° C) above ambient at the end of 30 minutes of standard fire test exposure.

Stairway Door / Hardware Function

SECTION 1008 DOORS, GATES AND TURNSTILES

1008.1.8.7 Stairway doors. Interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

1008.1.9 Panic and fire exit hardware. Where panic and fire exit hardware is installed, it shall comply with the following:

1. The actuating portion of the releasing device shall extend at least one-half of the door leaf width.

2. The maximum unlatching force shall not exceed 15 pounds (67 N).

Each door in a means of egress from a Group A or E occupancy having an occupant load of 50 or more and any Group H occupancy shall not be provided with a latch or lock unless it is panic hardware or fire exit hardware.

Vertical Exit Enclosure Doors

Means of Egress- Section 1020

SECTION 1020 VERTICAL EXIT ENCLOSURES

1020.1.1 Openings and penetrations. Exit enclosure opening protectives shall be in accordance with the requirements of Section 715. Where interior exit enclosures are extended to the exterior of a building by an exit passageway, the door assembly from the exit enclosure to the exit passageway shall be protected by a fire door assembly conforming to the requirements in Section 715.4. Fire door assemblies in exit enclosures shall comply with Section 715.4.4.

SECTION 715 OPENING PROTECTIVES

715.4.4 Doors in exit enclosures and exit passageways. Fire door assemblies in exit enclosures and exit passageways shall have a maximum transmitted temperature end point of not more than 450°F (250° C) above ambient at the end of 30 minutes of standard fire test exposure.

Horizontal Exit Doors

SECTION 1022 HORIZONTAL EXITS

1022.3 Opening protectives. Fire doors in horizontal exits shall be self-closing or automatic-closing when activated by a smoke detector in accordance with Section 715.4.7.3. Doors, where located in a cross-corridor condition, shall be automatic-closing by activation of a smoke detector installed in accordance with Section 715.4.7.3.

SECTION 715 OPENING PROTECTIVES

715.4.7.3 Smoke-activated doors. Automatic-closing doors installed in the following locations shall be automatic-closing by the actuation of smoke detectors installed in accordance with Section 907.10 or by loss of power to the smoke detector or hold-open device. Doors that are automatic-closing by smoke detection shall not have more than a 10-second delay before the door starts to close after the smoke detector is actuated.

Please see IBC 2006 Section 715.4.7.3 List of locations for Smoke-activated doors.

Lite Kits and Glazing Maximum Sizes

SECTION 715 OPENING PROTECTIVES

715.4.6 Glazing material. Fire-protection-rated glazing conforming to the opening protection requirements in Section 715.4 shall be permitted in fire door assemblies … fire-protection-rated glazing shall comply with the size limitations of NFPA 80.

Please see exemption in IBC-2006 Section 715.4.6.

NFPA 80

Duration	Standard Wire Glass (square inches)	High Limit Wire Glass (square inches)	Ceramic Glass (square inches)
3 hour	N/A	N/A	100
1 ½ hour	100	2208	2034
¾ hour	1296	2856	3204
20 minutes	1296	2856	3204

Door Protection

NFPA 80-6.4.5.3: Labeling shall not be required where the top of the protection plate is not more than 16 inches (406 mm) above the bottom of the door.

Protection plates: kick-plates, mop plates and armor plates.

Note that the 16 inch maximum can be exceeded if tested by an approved testing lab.

Undercut / Clearances

The undercut of a fire door may not exceed the requirements of NFPA 80.

NFPA 80-4.8.4 Clearance

4.8.4.1 The clearance under the bottom of a door shall be a maximum of **3⁄4** inch (19 mm).

4.8.5 Floor Coverings

4.8.5.1 Combustible floor coverings shall be permitted to extend through openings required to be protected by 1 1⁄2-hour, 1-hour, or 3⁄4-hour rated fire protection fire door assemblies without a sill where they have a minimum critical radiant flux of 0.22 W/cm2 in accordance with NFPA 253, Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

4.8.5.2 Combustible floor coverings shall not extend through openings protected by 3-hour rated fire protection door assemblies.

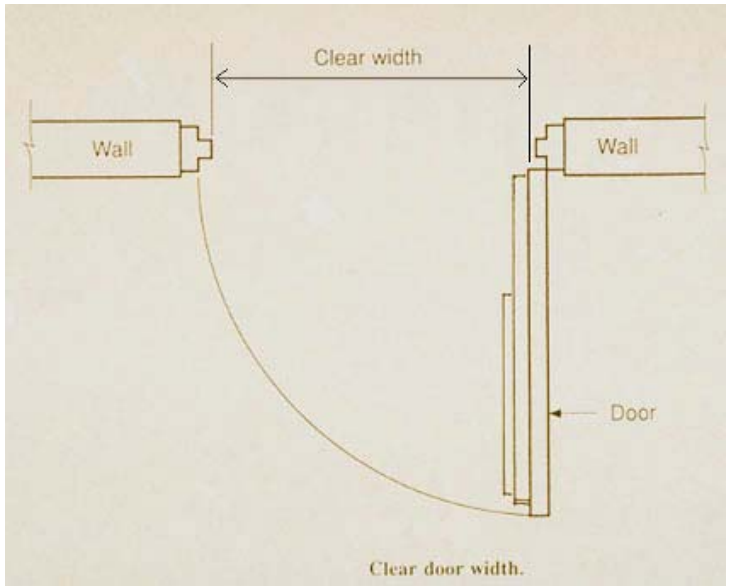
Note: 3-hour rated openings using a non-combustible floor sill allow for floor coverings to be extended through the opening.

32” Clear Width Leaf

IBC 2006 Means of Egress

SECTION 1008 DOORS, GATES AND TURNSTILES

1008.1.1 Size of doors. The minimum width of each door opening shall be sufficient for the occupant load thereof and shall provide a clear width of not less than 32 inches (813mm). Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad).



32” clear width leaf from face of jamb to face of door

Projects into Clear Width

Means of Egress

SECTION 1008 DOORS, GATES AND TURNSTILES

1008.1.1.1 Size of Doors. There shall not be projections into the required clear width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

Door Opening Force

ADA-4.13.11

Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.

SECTION 1008 DOORS, GATES AND TURNSTILES

1008.1.2 Door Swing. Doors shall swing in the direction of egress travel where serving an occupant load of 50 or more persons or a Group H occupancy. The opening force for interior side-swinging doors without closers shall not exceed a 5-pound (22 N) force. For other side-swinging, sliding and folding doors, the door latch shall release when subjected to a 15-pound (67 N) force. The door shall be set in motion when subjected to a 30-pound (133 N) force. The door shall swing to a full-open position when subjected to a 15-pound (67 N) force. Forces shall be applied to the latch side.

Door Opening Force

SECTION 1008 DOORS, GATES AND TURNSTILES

1008.1.3.2 Power-operated doors. Where means of egress doors are operated by power, such as doors with a photoelectric-actuated mechanism to open the door upon the approach of a person, or doors with power-assisted manual operation, the design shall be such that in the event of power failure, the door is capable of being opened manually to permit means of egress travel or closed where necessary to safeguard means of egress. The forces required to open these doors manually shall not exceed those specified in Section 1008.1.2, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of swinging from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. Full-power-operated doors shall comply with BHMA A156.10. Power-assisted and low-energy doors shall comply with BHMA A156.19.

Panic and Fire Exit Hardware

SECTION 1008 DOORS, GATES AND TURNSTILES

1008.1.8 Door operations. Except as specifically permitted by this section egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.

1008.1.8.1 Hardware. Door handles, pulls, latches, locks and other operating devices on doors required to be accessible by Chapter 11 shall not require tight grasping, tight pinching or twisting of the wrist to operate.

1008.1.8.2 Hardware height. Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor. Locks used only for security purposes and not used for normal operation are permitted at any height. (see Section 1008 for exceptions)

Panic and Fire Exit Hardware

BHMA (Builders Hardware Manufacturers Association) Definitions:

3.11.1 – Panic Hardware. A door latching assembly incorporating an actuating member usually called an actuating bar which releases the latching or locking mechanisms upon the application of force in the direction of exit travel.

3.11.2 – Fire Exit Hardware. Panic hardware which additionally provides fire protection when used as part of a fire door assembly.

Elevator Lobbies

More Than Three Stories / Separated by Fire Partitions

SECTION 707 SHAFT ENCLOSURES

707.14.1 Elevator lobby. An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby shall separate the elevator shaft enclosure doors from each floor by fire partitions equal to the fire-resistance rating of the corridor and the required opening protection. Elevator lobbies shall have at least one means of egress complying with Chapter 10 and other provisions within this code.

Elevator Lobbies

Separated by Smoke Partitions

707.14.1.5. Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

SECTION 710 SMOKE PARTITIONS

710.5.2 Smoke and draft control doors. Where required elsewhere in the code, doors in smoke partitions shall be tested in accordance with UL 1784 with an artificial bottom seal installed across the full width of the bottom of the door assembly during the test. The air leakage rate of the door assembly shall not exceed 3 cubic feet per minute per square foot [ft3/(min · ft2)](0.015424 m3/ s·m2) of door opening at 0.10 inch (24.9Pa) of water for both the ambient temperature test and the elevated temperature exposure test.

Elevator Shaft

Protection of Openings at the Elevator Shaft

SECTION 707 SHAFT ENCLOSURES

707.7 Openings. Openings in a shaft enclosure shall be protected in accordance with Section 715 as required for fire barriers. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 715.3.7.3.

Section 3002.6 Prohibited doors.

Doors, other than hoistway doors and the elevator car door, shall be prohibited at the point of access to an elevator car **unless such doors are readily openable from the car side without a key, tool, special knowledge or effort.**

Elevator Lobbies

Elevator Shaft

SECTION 707 SHAFT ENCLOSURES

707.14.1.3. Where additional doors are provided at the hoistway opening in accordance with Section 3002.6, such doors shall be tested in accordance with UL 1784 without an artificial bottom seal.

Designing in additional doors at the hoistway opening eliminates Elevator Lobbies, allowing for additional egress options. The doors are required to meet the Air Leakage rating which is not to exceed 3 cubic feet per minute per square foot of door opening.

The elevator car door is fire rated but does not meet the Air Leakage rating and therefore does not meet UL 1784 requirements at this application.

Smoke Barrier

SECTION 709 SMOKE BARRIERS

709.5 Openings. Openings in a smoke barrier shall be protected in accordance with Section 715. Exception: In Group I-2, where doors are installed across corridors, a pair of opposite-swinging doors without a center mullion shall be installed having vision panels with fire-protection-rated glazing materials in fire-protection-rated frames, the area of which shall not exceed that tested. The doors shall be close fitting within operational tolerances, and shall not have undercuts, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and shall be automatic-closing by smoke detection in accordance with Section 715.4.7.3. Positive-latching devices are not required.

Corridors and Smoke Barriers

SECTION 715 OPENING PROTECTIVES

715.4.3 Door assemblies in corridors and smoke barriers. Fire door assemblies required to have a minimum fire protection rating of 20 minutes where located in corridor walls or smoke-barrier walls having a fire-resistance rating in accordance with Table 715.4 shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

NFPA 252 OR UL 10C refers to the neutral pressure plane requirement established in the Positive Pressure test.

Corridors and Smoke Barriers

SECTION 715 OPENING PROTECTIVES

715.4.3 Door assemblies in corridors and smoke barriers.

Exceptions:

1.Viewports that require a hole not larger than 1 inch (25 mm) in diameter through the door, have at least a 0.25-inch-thick (6.4 mm) glass disc, and the holder is of metal that will not melt out where subject to temperatures of 1,700°F (927°C).

2.Corridor door assemblies in occupancies of Group I-2 shall be in accordance with Section 407.3.1.

3.Unprotected openings shall be permitted for corridors in multi-theater complexes where each motion picture auditorium has at least one-half of its required exit or exit access doorways opening directly to the exterior or into an exit passageway.

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Summary

Summary

- This course presented a review of the common definitions and terminology used in the industry, along with a discussion relating to occupancy classifications.
- The 2006 International Building Code requirements for fire rated door assemblies were discussed, including labeling requirements, temperature rise, door hardware, exit doors, glazing material, undercuts / clearances, size of doors, door opening force, elevator lobbies and shafts, corridor and smoke barriers, and positive pressure testing.
- Positive pressure is a new type of fire testing for doors and hardware that is being adopted in the U.S. market.

Summary

Summary cont'd…

- Fire doors must be self-closing and self-latching in order to meet the IBC-2006 requirements.
- A temperature rise door core material retards the fire side heat temperature from passing through to the non-fire side of the assembly and does not exceed 450°F above ambient room temperature after 30 minutes of fire exposure to the non-fire side.
- Elevator lobbies can be eliminated in a project if the elevator shaft has a tight fitting smoke and draft assembly at each opening.

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