

High-Rise Buildings

2021 International Building Code



Shums Coda Associates, Inc.

High-Rise Buildings 2021 International Building Code



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Today's Discussion

- Discuss the requirements for high-rise buildings in detail
 - Chapter 4 requirements
 - Fire Protection systems
 - Means of egress
 - Emergency systems
 - Elevators



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- Colorado Regional Manager, Education Director
- Over 40 years' experience in code administration and enforcement
- ICC Means of Egress Code Committee, Codes & Standards Committee, Code Correlation Committee
- Author
 - Building Code Basics, Commercial (2009, 2012)
 - Building Code Essentials (2015, 2018, 2021)
 - Applying Codes to Cannabis Facilities



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202 Definitions

- **HIGH-RISE BUILDING**
A building with an occupied floor located more than 75 feet above the lowest level of fire department vehicle access.



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Lowest Fire Department Vehicle Access

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Reduction in fire-resistance rating - 403.2.1

- The fire-resistance-rating reductions listed in Sections 403.2.1.1 and 403.2.1.2 shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.

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High-Rise Buildings 403.1 (Exceptions)

Does not apply to:

- Airport traffic control towers (Section 412.2)
- Open parking garages (Section 406.5)
- The portion of a buildings with a Group A-5 occupancy (303.6)
- Special industrial occupancies (Section 503.1.1)
- Buildings with a Group H-1, H-2 or H-3 occupancy (Section 415 & 426)

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Type of construction 403.2.1.1

- The following reductions in the minimum fire-resistance rating of the building elements in Table 601 shall be permitted as follows:
 - For buildings not greater than 420 feet in building height, the fire-resistance rating of the building elements in Type IA construction shall be permitted to be reduced to the minimum fire-resistance ratings for the building elements in Type IB.
 - In other than Group F-1, H-2, H-3, H-5, M and S-1 occupancies, the fire-resistance rating of the building elements in Type IB construction shall be permitted to be reduced to the fire-resistance ratings in Type IIA.
 - The building height and building area limitations of a building containing building elements with reduced fire-resistance ratings shall be permitted to be the same as the building without such reductions.

Exception: The required fire-resistance rating of columns supporting floors shall not be reduced.

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Shaft enclosures

403.2.1.2

- For buildings not greater than 420 feet in building height, the required fire-resistance rating of the fire barriers enclosing vertical shafts, other than interior exit stairway and elevator hoistway enclosures, is permitted to be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.



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403.2.2.1 - Wall assembly materials - soft body impact

- The wall assemblies making up the enclosures for interior exit stairways and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C 1629/C 1629M.



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Structural integrity of exit & hoistway enclosures - 403.2.2

- For high-rise buildings of Risk Category III or IV in accordance with Section 1604.5, and for all buildings that are more than 420 feet in building height, enclosures for interior exit stairways and elevator hoistway enclosures shall comply with Sections 403.2.2.1 through 403.2.2.4.



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403.2.2.2 - Wall assembly materials - hard body impact

The panels making up the enclosures for interior exit stairways and elevator hoistway enclosures that are not exposed to the interior of the enclosures for interior exit stairways or elevator hoistway enclosure shall be constructed in accordance with one of the following methods:

- The wall assembly shall incorporate not less than two layers of impact-resistant panels, each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C 1629/C 1629M.
- The wall assembly shall incorporate not less than one layer of impact-resistant panels that meet or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C 1629/C 1629M.
- The wall assembly incorporates multiple layers of any material, tested in tandem, that meet or exceed Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C 1629/C 1629M.

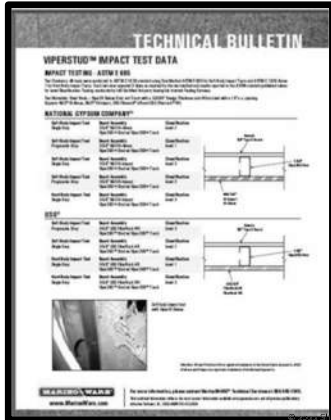
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Hard Body Impact Classification

ASTM C1629



- 2 layers HBIC Level 2
- 1 Layer HBIC Level 3
- Multiple layers that pass as HBIC Level 3
- Concrete Wall Assemblies
- Other HBIC 3 Equiv. Walls

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Other wall assemblies

403.2.2.4

- Any other wall assembly that provides impact resistance equivalent to that required by Sections 403.2.2.1 and 403.2.2.2 for Hard Body Impact Classification Level 3, as measured by the test method described in ASTM C 1629/C 1629M, shall be permitted.



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Concrete and masonry walls

403.2.2.3

- Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.2.1 and 403.2.2.2.



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Sprayed Fire-Resistant Materials

403.2.3

- The bond strength of the SFRM installed throughout the building shall be in accordance with Table 403.2.3.



HEIGHT OF BUILDING*	SFRM MINIMUM BOND STRENGTH
Up to 420 feet	430 psf
Greater than 420 feet	1,000 psf

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1705.15 Sprayed fire-resistant materials

- Special inspections and tests of sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6.
- Special inspections shall be based on the fire-resistance design as designated in the approved construction documents.



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403.3 Automatic sprinkler system

- Exception:
- An automatic sprinkler system shall not be required in spaces or areas of telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers or not less than 2-hour horizontal assemblies, or both.



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Automatic sprinkler system 403.3

- Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with NFPA 13 and a secondary water supply where required by Section 403.3.3.

Exception



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Sprinkler risers and system design - 403.3.1

- Each sprinkler system zone in buildings that are more than 420 feet in building height shall be supplied by a minimum of two risers.
- Each riser shall supply sprinklers on alternate floors.
- If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.
- Remotely located in stairway and per 1007.1 (1/3 the longest diagonal)



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Water supply to required fire pumps - 403.3.2



- In buildings that are more than 420 feet in building height and buildings of Type IVA and IVB construction that are more than 120 feet in building height, required fire pumps shall be supplied by connections to no fewer than two water mains located in different streets.
- Separate supply piping shall be provided between each connection to the water main and the pumps.
- Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

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403.3.3 Secondary water supply

- An automatic secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by Section 1613.
- An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system.
- The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13.



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Water supply to required fire pumps - 403.3.2

- Exception:
- Two connections to the same main shall be permitted provided the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through at least one of the connections.



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403.3.4 Fire pump room

- Fire pumps shall be located in rooms protected in accordance with Section 913.2.1.



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913.2.1 Protection of fire pump rooms

- Fire pumps shall be located in rooms that are separated from all other areas of the building by 2-hour fire barriers or 2-hour horizontal assemblies, or both.
- Exceptions
 - 1 not applicable
 - 2. Separation is not required for fire pumps physically separated in accordance with NFPA 20.



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907.2.13 High-rise buildings

- High-rise buildings shall be provided with an automatic smoke detection system in accordance with Section 907.2.13.1, a fire department communication system in accordance with Section 907.2.13.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.



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Emergency Systems 403.4



- Smoke detection per Section 907.2.13.1.
- Fire alarm per Section 907.2.13
- Standpipe system per Section 905.3
- Emergency voice/alarm communication system per Section 907.5.2.2.
- Emergency responder radio coverage per IFC 510
- Fire Command Center per Section 911

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907.2.13.1.1 Area smoke detection



- Area smoke detectors shall be provided in accordance with this section.
- Smoke detectors shall be connected to an automatic fire alarm system.
- The activation of any detector required by this section shall activate the emergency voice/alarm communication system in accordance with Section 907.5.2.2

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907.2.13.1.1 Area smoke detection



- In addition to smoke detectors required by Sections 907.2.1 through 907.2.9, smoke detectors shall be located as follows:
 - 1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room that is not provided with sprinkler protection.
 - 2. In each elevator machine room, machinery space, control room and control space and in elevator lobbies.

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907.2.13.1.2 Duct smoke detection



- 2. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air-conditioning system. In Group R-1 and R-2 occupancies, a smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm and serving not more than 10 air-inlet openings.

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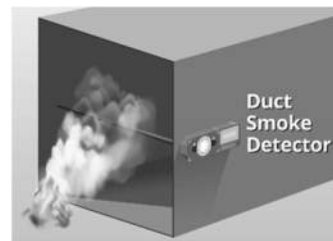
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907.2.13.1.2 Duct smoke detection

- Duct smoke detectors complying with Section 907.3.1 shall be located as follows:

- 1. In the main return air and exhaust air plenum of each air-conditioning system having a capacity greater than 2,000 cfm. Such detectors shall be located in a serviceable area downstream of the last duct inlet.



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907.2.13.2 Fire department communication system



- Where a wired communication system is approved in lieu of an in-building two-way emergency responder communication coverage system in accordance with Section 510 of the IFC, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 and shall operate between a fire command center complying with Section 911, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside interior exit stairways.
- The fire department communication device shall be provided at each floor level within the interior exit stairway.

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907.2.13.3 Multiple-channel voice evacuation

- In buildings with an occupied floor more than 120 feet above the lowest level of fire department vehicle access, voice evacuation systems for high-rise buildings shall be multiple-channel systems.



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907.5.2.2 - Emergency voice/alarm communication systems

- In high-rise buildings, the system shall operate on at least the alarming floor, the floor above and the floor below.
- Speakers shall be provided throughout the building by paging zones.
- At a minimum, paging zones shall be provided as follows:
 1. Elevator groups.
 2. Interior exit stairways.
 3. Each floor.
 4. Areas of refuge.



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907.5.2.2 - Emergency voice/alarm communication systems

- Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72.
- The operation of any automatic fire detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving approved information and directions for a general or staged evacuation in accordance with the building's fire safety and evacuation plans required by Section 404 of the IFC



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907.5.2.2.1 Manual override

- A manual override for emergency voice communication shall be provided on a selective and all-call basis for all paging zones.



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907.5.2.2.2 Live voice messages



- The emergency voice/alarm communication system shall have the capability to broadcast live voice messages by paging zones on a selective and all-call basis.

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907.5.2.2.5 Standby power



- Emergency voice/alarm communications systems shall be provided with standby power in accordance with Section 2702.

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907.5.2.2.3 Alternative uses

- The emergency voice/alarm communication system shall be allowed to be used for other announcements, provided that the manual fire alarm use takes precedence over any other use.



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905.3.1 Height (Standpipes)

- Class III standpipe systems shall be installed throughout buildings where any of the following conditions exist:
 1. Four or more stories are above or below grade plane.
 2. The floor level of the highest story is located more than 30 feet above the lowest level of fire department vehicle access.
 3. The floor level of the lowest story is located more than 30 feet below the highest level of fire department vehicle access.
- Exception for Class 1 standpipe w/ sprinklers



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905.4 - Location of Class I standpipe hose connections



- Class I standpipe hose connections shall be provided in all of the following locations:
- 1. In every required interior exit stairway, a hose connection shall be provided for each story above and below grade plane. Hose connections shall be located at the main floor landing unless otherwise approved by the fire code official.

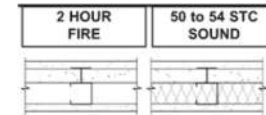
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905.4.1 Protection

- Risers and laterals of Class I standpipe systems not located within an interior exit stairway shall be protected by a degree of fire resistance equal to that required for vertical enclosures in the building in which they are located.
- Exception: In buildings equipped throughout with an approved automatic sprinkler system, laterals that are not located within an interior exit stairway are not required to be enclosed within fire-resistance-rated construction.



Thickness: 3 1/2"
 Approx. Weight: 9 pcf
 Fire Test: See WP 7051 (UL R7094, 93NK8151, 9-14-93, UL Design U429)
 Sound Test: See WP 7051 (RAL TL93-181, 7-1-93)

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905.4 - Location of Class I standpipe hose connections



- 5. Where the roof has a slope less than 4 units vertical in 12 units horizontal, a hose connection shall be located to serve the roof or at the highest landing of an interior exit stairway with access to the roof provided in accordance with Section 1011.12.

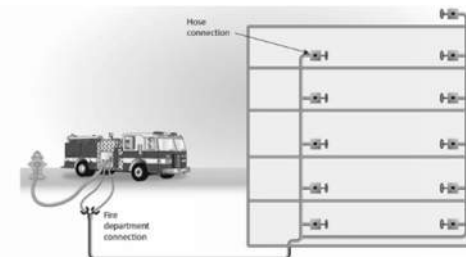
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905.4.2 Interconnection

- In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.



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202 Definitions

- Class I system
- A system providing 2 1/2-inch connections to supply water for use by fire departments and those trained in handling heavy fire streams.



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510.1 - Emergency responder communication coverage in new buildings

- Exceptions:
 1. Where approved by the building official and the fire code official, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an approved radio coverage system.
 2. Where it is determined by the fire code official that the radio coverage system is not needed.
 3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

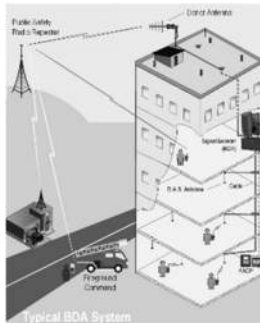


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510.1 - Emergency responder communication coverage in new buildings



- Approved in-building, two-way emergency responder communication coverage for emergency responders shall be provided in all new buildings.
- In-building, two-way emergency responder communication coverage within the building shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured at the exterior of the building.
- This section shall not require improvement of the existing public safety communication systems.

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911.1 Fire command center

- Where required by other sections of this code, in buildings classified as high-rise buildings by this code and in all F-1 and S-1 occupancies with a building footprint of over 500,000 square feet, a fire command center for fire department operations shall be provided and shall comply with Sections 911.1.1 through 911.1.7.



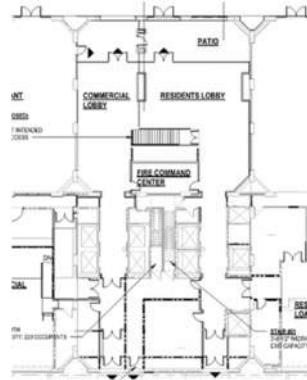
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911.1.1 Location and access

- The location and access to the fire command center shall be approved by the fire code official.



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911.1.3 Size

- The fire command center shall be not less than 0.015 percent of the total building area of the facility served or 200 square feet in area, whichever is greater, with a minimum dimension of 0.7 times the square root of the room area or 10 feet, whichever is greater.



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911.1.2 Separation



- The fire command center shall be separated from the remainder of the building by not less than a 1-hour fire barrier or horizontal assembly, or both.

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911.1.4 Layout approval

- A layout of the fire command center and all features required by this section to be contained therein shall be submitted for approval prior to installation.



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911.1.5 Storage



- Storage unrelated to operation of the fire command center shall be prohibited.

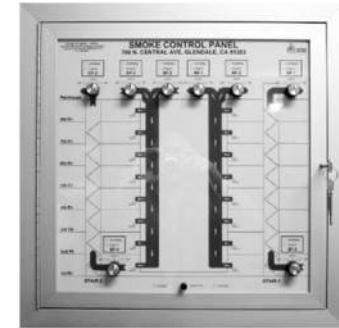
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911.1.6 Required features

- 5. Status indicators and controls for air distribution systems.
- 6. The fire fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
- 7. Controls for unlocking interior exit stairway doors simultaneously.
- 8. Sprinkler valve and waterflow detector display panels.
- 9. Emergency and standby power status indicators.



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911.1.6 Required features

- The fire command center shall comply with NFPA 72 and shall contain all of the following features:
 1. The emergency voice/alarm communication system control unit.
 2. The fire department communications system.
 3. Fire detection and alarm system annunciator.
 4. Annunciator unit visually indicating the location of the elevators and whether they are operational.



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911.1.6 Required features

- 10. A telephone for fire department use with controlled access to the public telephone system.
- 11. Fire pump status indicators.
- 12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, fire fighter air replenishment system, fire-fighting equipment and fire department access and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.



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911.1.6 Required features

- 13. An approved Building Information Card that contains, but is not limited to, the following information:
- 13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor), and the estimated building population during the day, night and weekend.



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911.1.6 Required features

- 13.4. Exit access and exit stairway information that includes: number of exit access and exit stairways in the building, each exit access and exit stairway designation and floors served, location where each exit access and exit stairway discharges, interior exit stairways that are pressurized, exit stairways provided with emergency lighting, each exit stairway that allows reentry, exit stairways providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby, location of freight elevator banks.



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911.1.6 Required features

- 13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager and building engineer and their respective work phone number, cell phone number, e-mail address.
- 13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns, and roof assembly.



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911.1.6 Required features

- 13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas service.



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911.1.6 Required features

- 13.6. Fire protection system information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers, location of different types of automatic sprinkler systems installed including, but not limited to, dry, wet and pre-action.
- 13.7 Hazardous material information that includes: location of hazardous material, quantity of hazardous material.



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911.1.7 - Fire command center identification

- The fire command center shall be identified by a permanent easily visible sign reading "FIRE COMMAND CENTER" located on the door to the fire command center.



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911.1.6 Required features

- 14. Work table.
- 15. Generator supervision devices, manual start and transfer features.
- 16. Public address system, where specifically required by other sections of this code.
- 17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.
- 18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.



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Smoke removal 403.4.7

- To facilitate smoke removal in post-fire salvage and overhaul operations, buildings and structures shall be equipped with natural or mechanical ventilation for removal of products of combustion in accordance with one of the following:
 - 1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50-foot intervals. The area of operable windows or panels shall not be less than 40 square feet per 50 linear feet of perimeter.
- **Exceptions:**
 - 1. In Group R-1 occupancies, each sleeping unit or suite having an exterior wall shall be permitted to be provided with 2 square feet of venting area in lieu of the area specified in Item 1.
 - 2. Windows shall be permitted to be fixed provided that glazing can be cleared by fire fighters.

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Smoke removal

403.4.7

2. Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.
3. Any other approved design that will produce equivalent results.



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202 Definitions

- STANDBY POWER SYSTEM
- A source of automatic electric power of a required capacity and duration to operate required building, hazardous materials or ventilation systems in the event of a failure of the primary power.
- Standby power systems are required for electrical loads where interruption of the primary power could create hazards or hamper rescue or fire-fighting operations.



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Standby/Emergency power

403.4.8

- A standby power system complying with Section 2702 and Section 3003 shall be provided for the standby power loads specified in Section 403.4.8.3.
- An emergency power system complying with Section 2702 shall be provided for the emergency power loads specified in Section 403.4.8.4.



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202 Definitions

- EMERGENCY POWER SYSTEM.
- A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection and ventilation systems in the event of a failure of the primary power.
- Emergency power systems are required for electrical loads where interruption of the primary power could result in loss of human life or serious injuries.



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403.4.8.1 Equipment room

- If the standby or emergency power system includes a generator set inside a building, the system shall be located in a separate room enclosed with 2-hour fire barriers or horizontal assemblies, or both.
- System supervision with manual start and transfer features shall be provided at the fire command center.
 - Exception: In Group I-2, Condition 2, manual start and transfer features for the critical branch of the emergency power are not required to be provided at the fire command center.



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403.4.8.3 Standby power loads

- The following are classified as standby power loads:

1. Ventilation and automatic fire detection equipment for smokeproof enclosures.
2. Elevators.
3. Where elevators are provided in a high-rise building for accessible means of egress, fire service access or occupant self-evacuation, the standby power system shall also comply with Sections 1009.4, 3007 or 3008, as applicable.



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403.4.8.2 Fuel line piping protection

- Fuel lines supplying a generator set inside a building shall be separated from areas of the building other than the room the generator is located in by one of the following methods:
 1. A fire-resistant pipe-protection system that has been tested in accordance with UL 1489. The system shall be installed as tested and in accordance with the manufacturer's installation instructions, and shall have a rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required rating shall be reduced to 1 hour.
 2. An assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the required fire-resistance rating shall be reduced to 1 hour.
 3. Other approved methods.

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403.4.8.4 Emergency power loads

- The following are classified as emergency power loads:
 1. Exit signs and means of egress illumination required by Chapter 10.
 2. Elevator car lighting.
 3. Emergency voice/alarm communications systems.
 4. Automatic fire detection systems.
 5. Fire alarm systems.
 6. Electrically powered fire pumps.
 7. Power and lighting for the fire command center required by Section 403.4.6.



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2702.1.1 Stationary generators

- Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200.



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2702.1.2 Fuel-line piping protection



- 1. A fire-resistant pipe-protection system that has been tested in accordance with UL 1489. The system shall be installed as tested and in accordance with the manufacturer's installation instructions, and shall have a rating of not less than 2 hours.
- Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required rating shall be reduced to 1 hour.

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2702.1.2 Fuel-line piping protection



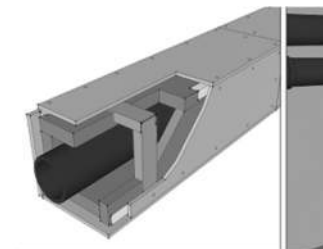
- Fuel lines supplying a generator set inside a high-rise building shall be separated from areas of the building other than the room the generator is located in by one of the following methods:

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2702.1.2 Fuel-line piping protection



- 2. An assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required fire-resistance rating shall be reduced to 1 hour.
- 3. Other approved methods.

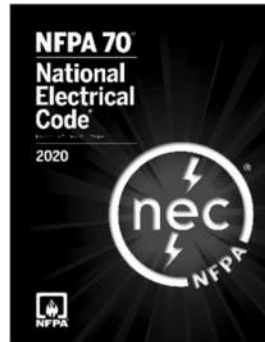
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2702.1.3 Installation

- Emergency power systems and standby power systems required by this code or the IFC shall be installed in accordance with the IFC, NFPA 70, NFPA 110 and NFPA 111.



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2702.1.5 Load duration

- Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code.



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2702.1.4 Load transfer



- Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code.
- Standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost, unless specified otherwise in this code.

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2702.1.6 Uninterruptible power source

- An uninterrupted source of power shall be provided for equipment where required by the manufacturer's instructions, the listing, this code or applicable referenced standards.



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2702.1.7 Interchangeability

- Emergency power systems shall be an acceptable alternative for installations that require standby power systems.



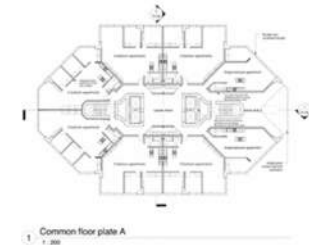
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403.5.1 Remoteness of interior exit stairways

- Required interior exit stairways shall be separated by a distance not less than 30 feet or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less.
- The distance shall be measured in a straight line between the nearest points of the enclosure surrounding the interior exit stairways.



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2702.4 Maintenance

- Emergency and standby power systems shall be maintained and tested in accordance with the IFC.



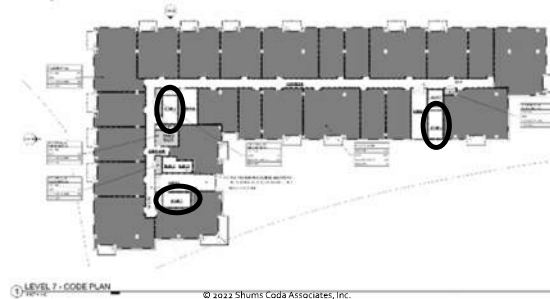
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403.5.1 Remoteness of interior exit stairways

- In buildings with three or more interior exit stairways, no fewer than two of the interior exit stairways shall comply with this section.
- Interlocking or scissor stairs shall be counted as one interior exit stairway.



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Additional Interior Exit Stairway 403.5.2



- For buildings other than Group R-2 and their ancillary spaces that are more than 420 feet in building height, one additional interior exit stairway meeting the requirements of Sections 1011 and 1023 shall be provided in addition to the minimum number of exits required by Section 1006.3.
- The total capacity of any combination of remaining interior exit stairways with one interior exit stairway removed shall be not less than the total capacity required by Section 1005.1.
- Scissor stairways shall not be considered the additional interior exit stairway required by this section.

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403.5.3 Stairway door operation

- Stairway doors other than the exit discharge doors shall be permitted to be locked from the stairway side.
- Stairway doors that are locked from the stairway side shall be capable of being unlocked simultaneously without unlatching upon a signal from the fire command center.



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Additional Interior Exit Stairway 403.5.2



- Exceptions:
 1. An additional interior exit stairway shall not be required to be installed in buildings having elevators used for occupant self-evacuation in accordance with Section 3008.
 2. An additional interior exit stairway shall not be required for other portions of the building where the highest occupiable floor level in those areas is less than 420 feet in building height.

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403.5.3.1 Stairway communication system



- A telephone or other two-way communications system connected to an approved constantly attended station shall be provided at not less than every fifth floor in each stairway where the doors to the stairway are locked.

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Smokeproof exit enclosures

403.5.4

- Every required stairway serving floors more than 75 feet above the lowest level of fire department vehicle access shall comply with Sections 909.20 and 1023.10



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1023.12.1

Termination and extension

- A smokeproof enclosure shall terminate at an exit discharge or a public way.
- The smokeproof enclosure shall be permitted to be extended by an exit passageway in accordance with Section 1023.3.
- The exit passageway shall be without openings other than the fire door assembly required by Section 1023.3.1 and those necessary for egress from the exit passageway.
- The exit passageway shall be separated from the remainder of the building by 2-hour fire barriers or horizontal assemblies, or both.



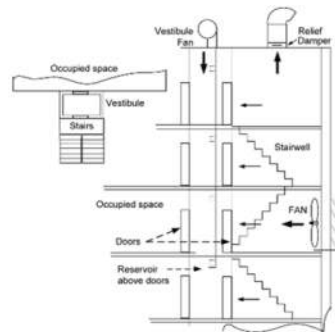
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Smokeproof Enclosure Definition

- An exit stairway or ramp designed and constructed so that the movement of the products of combustion produced by a fire occurring in any part of the building into the enclosure is limited.



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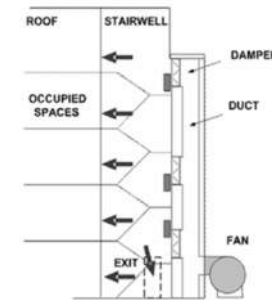
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1023.12.1

Termination and extension

- Exceptions:
- 1. Openings in the exit passageway serving a smokeproof enclosure are permitted where the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure, and openings are protected as required for access from other floors.



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1023.12.1 Termination and extension

- 2. The fire barrier separating the smokeproof enclosure from the exit passageway is not required, provided that the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure.
- 3. A smokeproof enclosure shall be permitted to egress through areas on the level of exit discharge or vestibules as permitted by Section 1028.



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1023.13 Standpipes

- Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.



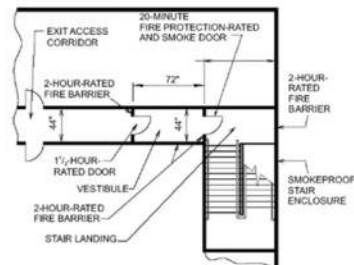
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Enclosure Access 1023.12.2

- Access to the stairway or ramp within a smokeproof enclosure shall be by way of a vestibule or an open exterior balcony.
- Exception: Access is not required by way of a vestibule or exterior balcony for stairways and ramps using the pressurization alternative complying with Section 909.20.5.



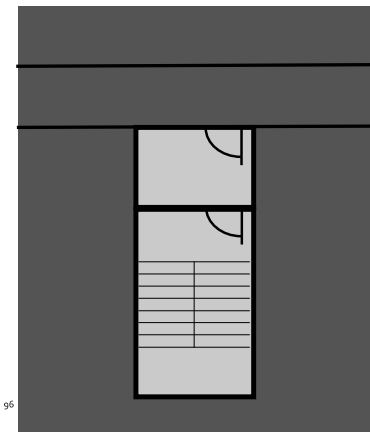
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Access 909.20.1

- Access to the stairway or ramp shall be by way of a vestibule or an open exterior balcony.
- The minimum dimension of the vestibule shall be not less than the required width of the corridor leading to the vestibule but shall not have a width of less than 44 inches and shall not have a length of less than 72 inches in the direction of egress travel.



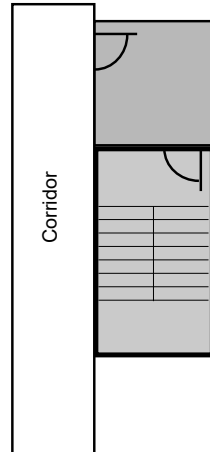
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Construction 909.20.2

- The smokeproof enclosure shall be separated from the remainder of the building by not less than a 2-hour fire-resistance-rated fire barrier or horizontal assemblies or both.
- Openings not permitted other than the required means of egress doors.



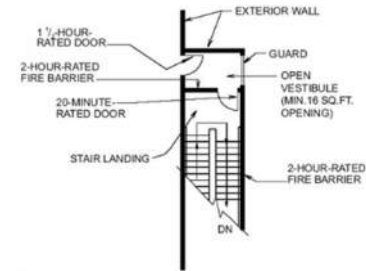
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Construction 909.20.2

- The open exterior balcony shall be constructed in accordance with the fire-resistance-rating requirements for floor construction.



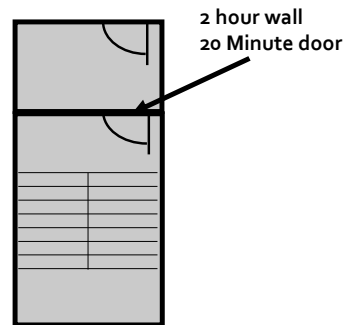
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Construction 909.20.2

- The vestibule shall be separated from the stairway by not less than a 2-hour fire-resistance-rated fire barrier or horizontal assembly.



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Door Closers 909.20.2.1

- Self- or automatic-closing by actuation of a smoke detector installed at the floor-side entrance to the smokeproof enclosure
- The actuation of the smoke detector on any door shall activate the closing devices on all doors in the smokeproof enclosure at all levels.
- Smoke detectors shall be installed in accordance with Section 907.10.



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Natural Ventilation Alternative 909.20.3



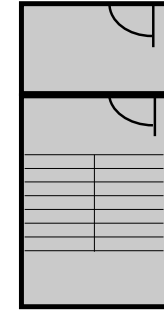
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Vestibule Doors 909.20.3.2

- Where access to the stairway or ramp is by way of a vestibule, the door assembly into the vestibule shall be a fire door complying with Section 716.
- The door assembly from the vestibule to the stairway shall have not less than a 20-minute fire protection rating complying with Section 716.



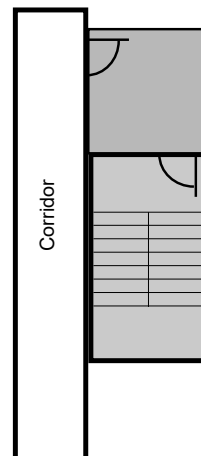
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Balcony Doors 909.20.3.1

- Where access to the stairway or ramp is by way of an open exterior balcony, the door assembly into the enclosure shall be a fire door in accordance with Section 716.



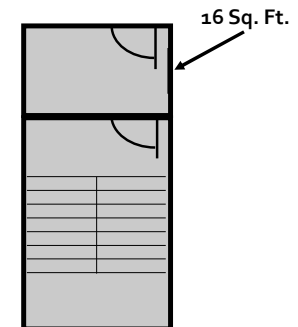
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Vestibule Ventilation 909.20.3.3

- Each vestibule shall have a minimum net area of 16 square feet of opening in a wall facing an outer court, yard or public way that is not less than 20 feet in width.



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Mechanical Ventilation Alternative 909.20.4



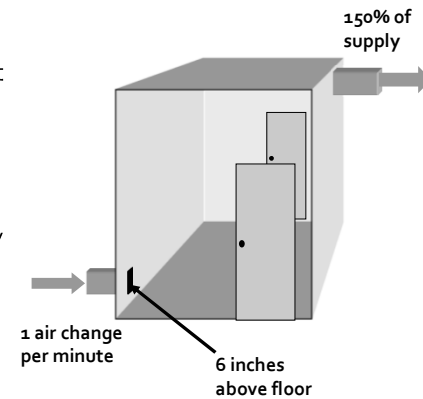
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Vestibule Ventilation 909.20.4.2

- The vestibule shall be supplied with not less than one air change per minute and the exhaust shall be not less than 150 percent of supply.
- Supply air shall enter and exhaust air shall discharge from the vestibule through separate, tightly constructed ducts used only for that purpose.
- Supply air shall enter the vestibule within 6 inches of the floor level.

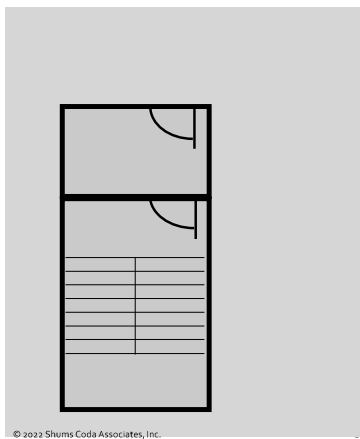


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Vestibule Doors 909.20.4.1



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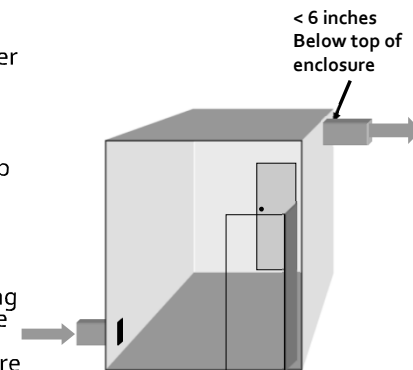
- The door assembly from the building into the vestibule shall be a fire door assembly complying with Section 716.2.2.1.
- The door assembly from the vestibule to the stairway or ramp shall not have less than a 20-minute fire protection rating and shall meet the requirements for a smoke door assembly in accordance with Section 716.2.2.1.
- The door shall be installed in accordance with NFPA 105.

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Vestibule Ventilation 909.20.4.2

- The top of the exhaust register shall be located at the top of the smoke trap but not more than 6 inches down from the top of the trap, and shall be entirely within the smoke trap area.
- Doors in the open position shall not obstruct duct openings.
- Duct openings with controlling dampers are permitted where necessary to meet the design requirements, but dampers are not otherwise required.



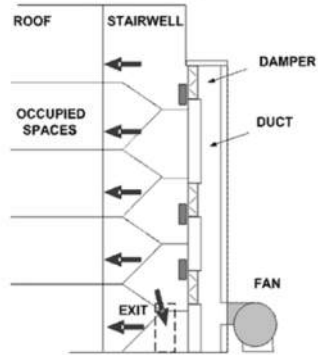
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Engineered Ventilation System

909.20.4.2.1



- Where a specially engineered system is used, the system shall exhaust a quantity of air equal to not less than 90 air changes per hour from any vestibule in the emergency operation mode and shall be sized to handle three vestibules simultaneously.
- Smoke detectors shall be located at the floor-side entrance to each vestibule and shall activate the system for the affected vestibule. Smoke detectors shall be installed in accordance with Section 907.3.

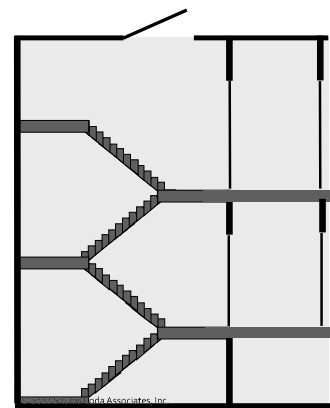
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Stairway or Ramp Shaft Air Movement System

909.20.4.4



- The stairway or ramp shaft shall be provided with a dampered relief opening and supplied with sufficient air to maintain a minimum positive pressure of 0.10 inch of water in the shaft relative to the vestibule with all doors closed.

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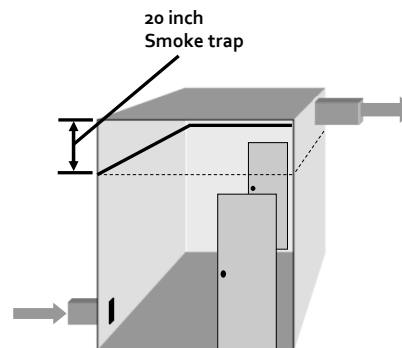
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Smoke Trap

909.20.4.3

- The vestibule ceiling shall be not less than 20 inches higher than the door opening into the vestibule to serve as a smoke and heat trap and to provide an upward-moving air column.
- The height shall not be decreased unless approved and justified by design and test.



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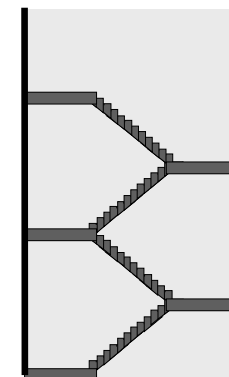
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Stairway or Ramp Pressurization Alternative

909.20.5

- Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the vestibule is not required, provided each interior exit stairway or ramp is pressurized to not less than 0.10 inch of water and not more than 0.35 inches of water in the shaft relative to the building measured with all interior exit stairway and ramp doors closed under maximum anticipated conditions of stack effect and wind effect.



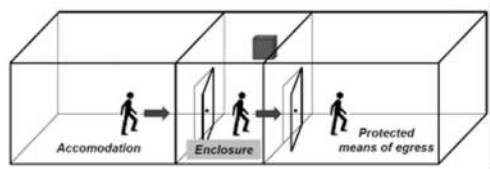
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909.20.6 – Pressurized stair and vestibule alternative

- The provisions of Sections 909.20.6.1 through 909.20.6.3 shall apply to smokeproof enclosures using a pressurized stair and pressurized entrance vestibule.



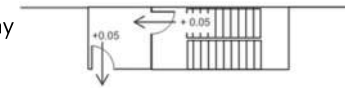
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909.20.6.2 Pressure difference

- The stair enclosure shall be pressurized to not less than 0.05 inch of water gage positive pressure relative to the vestibule with all stairway doors closed under the maximum anticipated stack pressures.
- The vestibule, with doors closed, shall have not less than 0.05 inch of water gage positive pressure relative to the fire floor.
- The pressure difference across doors shall not exceed 30 pounds maximum force to begin opening the door.

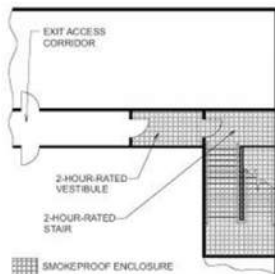


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909.20.6.1 Vestibule doors



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- The door assembly from the building into the vestibule shall be a fire door assembly complying with Section 716.2.2.1.
- The door assembly from the vestibule to the stairway shall have not less than a 20-minute fire protection rating and meet the requirements for a smoke door assembly in accordance with Section 716.2.2.1.
- The door shall be installed in accordance with NFPA 105.

909.20.6.3 Dampered relief opening

- A controlled relief vent having the capacity to discharge not less than 2,500 cubic feet per minute of air at the design pressure difference shall be located in the upper portion of the pressurized exit enclosure.

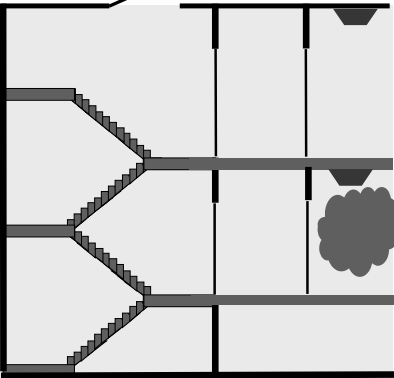


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Ventilating Equipment 909.20.7

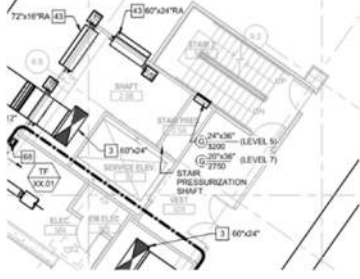


- The activation of ventilating equipment required by the alternatives in Sections 909.20.4 and 909.20.5 shall be by smoke detectors installed at each floor level at an approved location at the entrance to the smokeproof enclosure.
- When the closing device for the stair shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels.
- Smoke detectors shall be installed in accordance with Section 907.10.

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Ventilation Systems 909.20.7.1

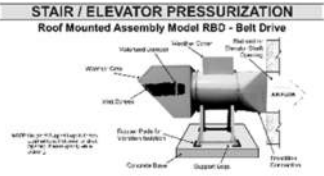
2. Equipment, control wiring, power wiring and ductwork shall be located within the smokeproof enclosure with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour fire barriers or horizontal assemblies, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour fire barriers or horizontal assemblies, or both.



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Ventilation Systems 909.20.7.1

- Smokeproof enclosure ventilation systems shall be independent of other building ventilation systems. The equipment and ductwork shall comply with one of the following:
 1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the smokeproof enclosure or connected to the smokeproof enclosure by ductwork enclosed by not less than 2-hour fire barriers or horizontal assemblies, or both



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Ventilation Systems 909.20.7.1

- 1. Control wiring and power wiring located out-side of a 2-hour fire barrier construction shall be protected using any one of the following methods:
 - 1.1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 2 hours.
 - 1.2. Where encased with not less than 2 inches of concrete.
 - 1.3. Electrical circuit protective systems shall have a fire-resistance rating of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.



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Standby Power 909.20.7.2



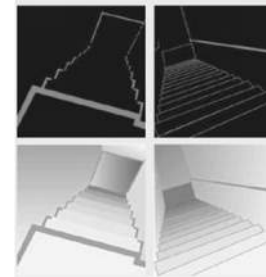
- Mechanical vestibule and stairway and ramp shaft ventilation systems and automatic fire detection systems shall be provided with standby power in accordance with Section 2702.

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Luminous Egress Path Markings - 403-5.5



- Luminous egress path markings shall be provided in accordance with Section 1025.



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Acceptance And Testing 909.20.7.3



- Before the mechanical equipment is approved, the system shall be tested in the presence of the building official to confirm that the system is operating in compliance with these requirements.

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Luminous Egress Path Markings 1025.1



- Approved luminous egress path markings delineating the exit path shall be provided in high-rise buildings of Group A, B, E, I-1, M or R-1 occupancies in accordance with this section.

- Exceptions:
Not required on the level of exit discharge in lobbies that serve as part of the exit path in accordance with Section 1028.1, Exception 1.

Retroactive in IFC!

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1025.2 Markings within exit components

- Egress path markings shall be provided in interior exit stairways, interior exit ramps and exit passageways, in accordance with Sections 1025.2.1 through 1025.2.6.3.



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1025.2.1 Steps

- The leading edge of the stripe shall be placed not more than 1/2 inch from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch down the vertical face of the step.
- Exception: The minimum width of 1 inch shall not apply to outlining stripes listed in accordance with UL 1994.



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1025.2.1 Steps

- A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step.
- Outlining stripes shall have a minimum horizontal width of 1 inch and a maximum width of 2.



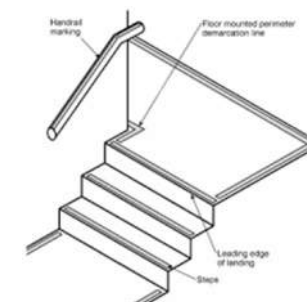
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1025.2.2 Landings

- The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

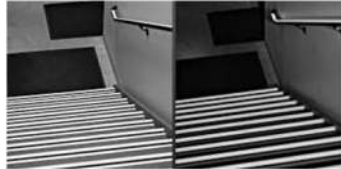


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1025.2.3 Handrails



- Handrails and handrail extensions shall be marked with a solid and continuous stripe having a minimum width of 1 inch.
- The stripe shall be placed on the top surface of the handrail for the entire length of the handrail, including extensions and newel post caps.
- Where handrails or handrail extensions bend or turn corners, the stripe shall not have a gap of more than 4 inches.
- Exception: The minimum width of 1 inch shall not apply to outlining stripes listed in accordance with UL 1994.

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1025.2.4.1 - Floor-mounted demarcation lines



- Perimeter demarcation lines shall be placed within 4 inches of the wall and shall extend to within 2 inches of the markings on the leading edge of landings.
- The demarcation lines shall continue across the floor in front of all doors.
- Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit and through which occupants must travel to complete the exit path.

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1025.2.4 Perimeter demarcation lines

- Stair landings and other floor areas within interior exit stairways, interior exit ramps and exit passageways, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both.
- The stripes shall be 1 to 2 inches wide with interruptions not exceeding 4 inches.
- Exception: The minimum width of 1 inch shall not apply to outlining stripes listed in accordance with UL 1994.



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1025.2.4.2 Wall-mounted demarcation lines

- Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe not more than 4 inches above the finished floor.
- At the top or bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches of the step or landing edge.
- Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path.



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1025.2.4.2 Wall-mounted demarcation lines

- Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.



- Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit and through which occupants must travel to complete the exit path.

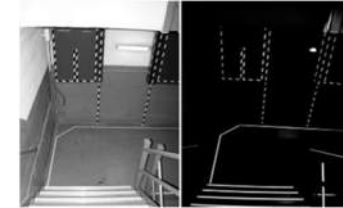
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1025.2.5 Obstacles

- Obstacles at or below 6 feet 6 inches in height and projecting more than 4 inches into the egress path shall be outlined with markings not less than 1 inch in width comprised of a pattern of alternating equal bands, of luminous material and black, with the alternating bands not more than 2 inches thick and angled at 45 degrees.



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1025.2.4.3 Transition



- Where a wall-mounted demarcation line transitions to a floor-mounted demarcation line, or vice versa, the wall-mounted demarcation line shall drop vertically to the floor to meet a complimentary extension of the floor-mounted demarcation line, thus forming a continuous marking.

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1025.2.5 Obstacles

- Obstacles shall include, but are not limited to, standpipes, hose cabinets, wall projections and restricted height areas.
- However, such markings shall not conceal any required information or indicators including but not limited to instructions to occupants for the use of standpipes.
- Exception: The minimum width of 1 inch shall not apply to markings listed in accordance with UL 1994.



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1025.2.6 Doors within the exit path



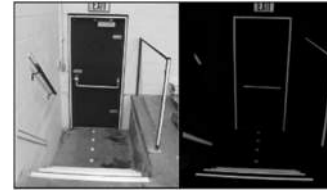
- Doors through which occupants must pass in order to complete the exit path shall be provided with markings complying with Sections 1025.2.6.1 through 1025.2.6.3.

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1025.2.6.2 Door hardware markings



- Door hardware shall be marked with not less than 16 square inches of luminous material.
- This marking shall be located behind, immediately adjacent to, or on the door handle or escutcheon.
- Where a panic bar is installed, such material shall be not less than 1 inch wide for the entire length of the actuating bar or touchpad.

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1025.2.6.1 Emergency exit symbol

- The doors shall be identified by a low-location luminous emergency exit symbol complying with NFPA 170.
- The exit symbol shall be not less than 4 inches in height and shall be mounted on the door, centered horizontally, with the top of the symbol not higher than 18 inches above the finished floor.



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1025.2.6.3 Door frame markings

- The top and sides of the door frame shall be marked with a solid and continuous 1-inch- to 2-inch-wide stripe.
- Where the door molding does not provide sufficient flat surface on which to locate the stripe, the stripe shall be permitted to be located on the wall surrounding the frame.



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1025.3 Uniformity



- Placement and dimensions of markings shall be consistent and uniform throughout the same enclosure.

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1025.5 Illumination

- Where photoluminescent exit path markings are installed, they shall be provided with not less than 1 footcandle of illumination for not less than 60 minutes prior to periods when the building is occupied and continuously during occupancy.



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Self Luminous and Photoluminescent 1025.4



- Luminous egress path markings shall be permitted to be made of any material, including paint, provided that an electrical charge is not required to maintain the required luminance. Such materials shall include, but are not limited to, *self-luminous materials* and *photoluminescent materials*. *Materials shall comply with either of the following standards:*

1. UL 1994; or
2. ASTM E 2072, except that the charging source shall be 1 foot-candle of fluorescent illumination for 60 minutes, and the minimum luminance shall be 30 millicandelas per square meter at 10 minutes and 5 millicandelas per square meter after 90 minutes.

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403.6.1 Fire Service Access Elevators –



- In buildings with an occupied floor more than 120 feet above the lowest level of fire department vehicle access, no fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007.
- Each fire service access elevator shall have a capacity of not less than 3500 pounds and shall comply with Section 3002.4.

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3007.1 Fire Service Access Elevator

- Where required by Section 403.6.1, every floor above and including the lowest level of fire department vehicle access of the building shall be served by fire service access elevators complying with Sections 3007.1 through 3007.9.
- Except as modified in this section, fire service access elevators shall be installed in accordance with this chapter and ASME A17.1/CSA B44.



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3007.2 Automatic sprinkler system

- The building shall be equipped throughout with an automatic sprinkler system in accordance with NFPA 13, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3007.2.1.



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3007.1 Fire Service Access Elevator

- Exceptions:
 1. Elevators that only service an open or enclosed parking garage and the lobby of the building shall not be required to serve as fire service access elevators.
 2. The elevator shall not be required to serve the top floor of a building where that floor is utilized only for equipment for building systems.



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3007.2.1 Prohibited locations

- Automatic sprinklers shall not be installed in machine rooms, elevator machinery spaces, control rooms, control spaces and elevator hoistways of fire service access elevators.



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3007.2.2 Sprinkler system monitoring



- The sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's fire alarm system.

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3007.4 Shunt trip



- Means for elevator shutdown in accordance with Section 3005.5 shall not be installed on elevator systems used for fire service access elevators.

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3007.3 Water protection

- Water from the operation of an automatic sprinkler system outside the enclosed lobby shall be prevented from infiltrating into the hoistway enclosure in accordance with an approved method.



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3005.5 Shunt trip



- Where elevator hoistways, elevator machine rooms, control rooms and control spaces containing elevator control equipment are protected with automatic sprinklers, a means installed in accordance with Section 21.4 of NFPA 72 shall be provided to automatically disconnect the main line power supply to the affected elevator prior to the application of water.
- This means shall not be self-resetting.
- The activation of automatic sprinklers outside the hoistway, machine room, machinery space, control room or control space shall not disconnect the main line power supply.

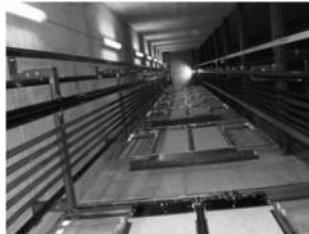
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3007.5 Hoistway enclosures

- The fire service access elevator hoistway shall be located in a shaft enclosure complying with Section 713.
- The fire service access elevator hoistway enclosure shall comply with Sections 403.2.2.1 through 403.2.2.4.
- When fire-fighters' emergency operation is active, the entire height of the hoistway shall be illuminated at not less than 1 footcandle as measured from the top of the car of each fire service access elevator.



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3007.6.1 - Access to interior exit stairway or ramp

- The enclosed fire service access elevator lobby shall have direct access from the enclosed elevator lobby to an enclosure for an interior exit stairway or ramp.
- Exception: Access to an interior exit stairway or ramp shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.2.2.1.



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3007.6 Fire service access elevator lobby



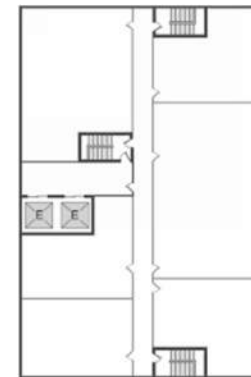
- The fire service access elevator shall open into an enclosed fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.6.5.
- Egress is permitted through the enclosed elevator lobby in accordance with Item 1 of Section 1016.2.
- Exception: Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to be protected in accordance with Section 3006.3. (Elevator lobby)

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3007.6.2 Lobby enclosure



— 2-hour fire resistance rating
- - - 1-hour fire resistance rating

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- The fire service access elevator lobby shall be enclosed with a smoke barrier having a fire-resistance rating of not less than 1 hour, except that lobby doorways shall comply with Section 3007.6.3.
- Exception: Enclosed fire service access elevator lobbies are not required at the levels of exit discharge.

3007.6.3 Lobby doorways

- Other than doors to the hoistway, elevator control room or elevator control space, each doorway to an enclosed fire service access elevator lobby shall be provided with a 3/4-hour fire door assembly complying with Section 716.
- The fire door assembly shall comply with the smoke and draft control door assembly requirements of Section 716.2.2.1.1 and be tested in accordance with UL 1784 without an artificial bottom seal.



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3007.6.5 Fire service access elevator symbol

- A pictorial symbol of a standardized design designating which elevators are fire service access elevators shall be installed on each side of the hoistway door frame on the portion of the frame at right angles to the fire service access elevator lobby.
- The fire service access elevator symbol shall be designed as shown in Figure 3007.6.5 and shall comply with the following:



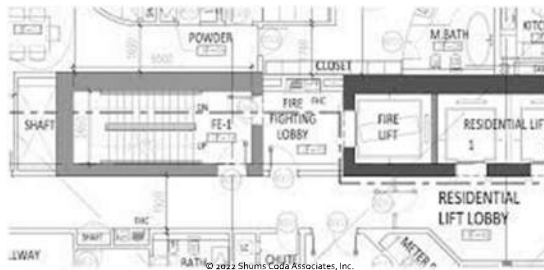
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3007.6.4 Lobby size

- Regardless of the number of fire service access elevators served by the same elevator lobby, the enclosed fire service access elevator lobby shall be not less than 150 square feet in an area with a dimension of not less than 8 feet.



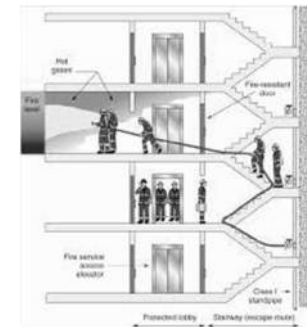
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3007.6.5 Fire service access elevator symbol

1. The fire service access elevator symbol shall be not less than 3 inches in height.
2. The helmet shall contrast with the background, with either a light helmet on a dark background or a dark helmet on a light background.
3. The vertical center line of the fire service access elevator symbol shall be centered on the hoistway door frame. Each symbol shall be not less than 78 inches, and not more than 84 inches above the finished floor at the threshold.



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3007.7 Elevator system monitoring



- The fire service access elevator shall be continuously monitored at the fire command center by a standard emergency service interface system meeting the requirements of NFPA 72.

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3007.8.1 Protection of wiring or cables



- Wires or cables that are located outside of the elevator hoistway and machine room and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to fire service access elevators shall be protected using one of the following methods:

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3007.8 Electrical power

- The following features serving each fire service access elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:



1. Elevator equipment.
2. Elevator hoistway lighting.
3. Ventilation and cooling equipment for elevator machine rooms, control rooms, machine spaces and control spaces.
4. Elevator car lighting.

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3007.8.1 Protection of wiring or cables



1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 2 hours.
2. Electrical circuit protective systems shall have a fire-resistance rating of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a fire-resistance rating of not less than 2 hours.

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3007.8.1 Protection of wiring or cables



- Exception:
- Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operations.

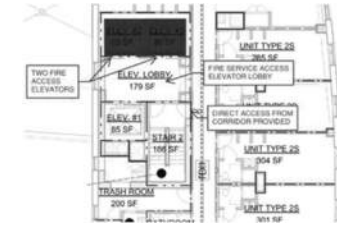
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3007.9.1 Access

- The exit enclosure containing the standpipe shall have access to the floor without passing through the enclosed fire service access elevator lobby.



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3007.9 Standpipe hose connection

- A Class I standpipe hose connection in accordance with Section 905 shall be provided in the interior exit stairway and ramp having direct access from the enclosed fire service access elevator lobby.



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403.6.2 Occupant evacuation elevators



- Where installed in accordance with Section 3008, passenger elevators for general public use shall be permitted to be used for occupant self-evacuation.

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3008.1.1 - Number of occupant evacuation elevators

- The number of elevators available for occupant evacuation shall be determined based on an egress analysis that addresses one of the following scenarios:
 1. Full-building evacuation where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 1 hour.
 2. Evacuation of the five consecutive floors with the highest cumulative occupant load where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 15 minutes.



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3008.1.2 Additional exit stairway

- Where an additional means of egress is required in accordance with Section 403.5.2, an additional exit stairway shall not be required to be installed in buildings provided with occupant evacuation elevators complying with Section 3008.1.



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3008.1.1 - Number of occupant evacuation elevators

- Not less than one elevator in each bank shall be designated for occupant evacuation.
- Not less than two shall be provided in each occupant evacuation elevator lobby where more than one elevator opens into the lobby.
- Signage shall be provided to denote which elevators are available for occupant evacuation.



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3008.1.3 Fire safety and evacuation plan

- The building shall have an approved fire safety and evacuation plan in accordance with the applicable requirements of Section 404 of the IFC.
- The fire safety and evacuation plan shall incorporate specific procedures for the occupants using evacuation elevators.



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3008.1.4 Operation

- The occupant evacuation elevators shall be used for occupant self-evacuation in accordance with the occupant evacuation operation requirements in ASME A17.1/CSA B44 and the building's fire safety and evacuation plan.



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3008.2.1 Prohibited locations

- Automatic sprinklers shall not be installed in elevator machine rooms, machinery spaces, control rooms, control spaces and elevator hoistways of occupant evacuation elevators.



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3008.2 Automatic sprinkler system



- The building shall be equipped throughout with an approved, electrically supervised automatic sprinkler system in accordance with Section 903.3.1.1, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3008.2.1.

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3008.2.2 Sprinkler system monitoring

- The automatic sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's fire alarm system.



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3008.3 Water protection



- Water from the operation of an automatic sprinkler system outside the enclosed lobby shall be prevented from infiltrating into the hoistway enclosure in accordance with an approved method.

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3008.5 Hoistway enclosure protection



- Occupant evacuation elevator hoistways shall be located in shaft enclosures complying with Section 713.
- Occupant evacuation elevator hoistway enclosures shall comply with Sections 403.2.2.1 through 403.2.2.4.

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3008.4 Shunt trip

- Means for elevator shutdown in accordance with Section 3005.5 shall not be installed on elevator systems used for occupant evacuation elevators.



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3008.6 - Occupant evacuation elevator lobby

- Occupant evacuation elevators shall open into an enclosed elevator lobby in accordance with Sections 3008.6.1 through 3008.6.6. Egress is permitted through the elevator lobby in accordance with Item 1 of Section 1016.2.

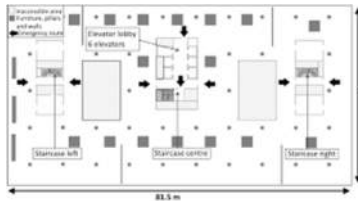


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3008.6.1 - Access to interior exit stairway or ramp



- The occupant evacuation elevator lobby shall have direct access from the enclosed elevator lobby to an interior exit stairway or ramp.
- Exceptions:
 1. Access to an interior exit stairway or ramp shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.2.2.1.

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3008.6.2 Lobby enclosure

- The occupant evacuation elevator lobby shall be enclosed with a smoke barrier having a fire-resistance rating of not less than 1 hour, except that lobby doorways shall comply with Section 3008.6.3.
- Exception: Enclosed occupant evacuation elevator lobbies are not required at the levels of exit discharge.



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3008.6.1 - Access to interior exit stairway or ramp



- 2. Elevators that only service an open parking garage and the lobby of the building shall not be required to provide direct access.

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3008.6.3 Lobby doorways



- Other than the doors to the hoistway, elevator machine rooms, machinery spaces, control rooms and control spaces within the lobby enclosure smoke barrier, each doorway to an occupant evacuation elevator lobby shall be provided with a 3/4-hour fire door assembly complying with Section 716.
- The fire door assembly shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1.1 and be tested in accordance with UL 1784 without an artificial bottom seal.

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3008.6.3.1 Vision panel

- A vision panel shall be installed in each fire door assembly protecting the lobby doorway.
- The vision panel shall consist of fire-protection-rated glazing, shall comply with the requirements of Section 716 and shall be located to furnish clear vision of the occupant evacuation elevator lobby.



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3008.6.4 Lobby size



- Each occupant evacuation elevator lobby shall have minimum floor area as follows:
 1. The occupant evacuation elevator lobby floor area shall accommodate, at 3 square feet per person, not less than 25 percent of the occupant load of the floor area served by the lobby.

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3008.6.3.2 Door closing

- Each fire door assembly protecting the lobby doorway shall be automatic-closing upon receipt of any fire alarm signal from the emergency voice/alarm communication system serving the building.



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3008.6.4 Lobby size

- 2. The occupant evacuation elevator lobby floor area shall accommodate one wheelchair space of 30 inches by 52 inches for each 50 persons, or portion thereof, of the occupant load of the floor area served by the lobby.
 - Exception: The size of lobbies serving multiple banks of elevators shall have the minimum floor area approved on an individual basis and shall be consistent with the building's fire safety and evacuation plan.



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3008.6.5 Signage



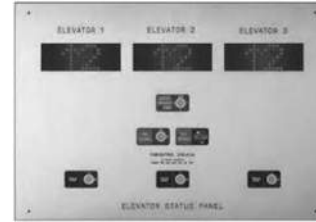
- An approved sign indicating elevators are suitable for occupant self-evacuation shall be posted on all floors adjacent to each elevator call station serving occupant evacuation elevators.

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3008.7 Elevator system monitoring



- The occupant evacuation elevators shall be continuously monitored at the fire command center or a central control point approved by the fire department and arranged to display all of the following information:
 1. Floor location of each elevator car.
 2. Direction of travel of each elevator car.
 3. Status of each elevator car with respect to whether it is occupied.

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3008.6.6 Two-way communication system

- A two-way communication system shall be provided in each occupant evacuation elevator lobby for the purpose of initiating communication with the fire command center or an alternate location approved by the fire department.
- The two-way communication system shall be designed and installed in accordance with Sections 1009.8.1 and 1009.8.2.

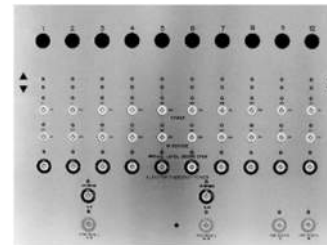


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3008.7 Elevator system monitoring



- 4. Status of normal power to the elevator equipment, elevator machinery and electrical apparatus cooling equipment where provided, elevator machine room, control room and control space ventilation and cooling equipment.

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3008.7 Elevator system monitoring



- 5. Status of standby or emergency power system that provides backup power to the elevator equipment, elevator machinery and electrical cooling equipment where provided, elevator machine room, control room and control space ventilation and cooling equipment.

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3008.7.1 Elevator recall

- The fire command center or an alternate location approved by the fire department shall be provided with the means to manually initiate a Phase I Emergency Recall of the occupant evacuation elevators in accordance with ASME A17.1/CSA B44.



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3008.7 Elevator system monitoring



- 6. Activation of any fire alarm initiating device in any elevator lobby, elevator machine room, machine space containing a motor controller or electric driving machine, control space, control room or elevator hoistway.

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3008.8 Electrical power



- The following features serving each occupant evacuation elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. Ventilation and cooling equipment for elevator machine rooms, control rooms, machinery spaces and control spaces.
3. Elevator car lighting.

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3008.8.1 Determination of standby power load

- Standby power loads shall be based on the determination of the number of occupant evacuation elevators in Section 3008.1.1.



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3008.8.2 Protection of wiring or cables



- Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 2 hours.
- Electrical circuit protective systems shall have a fire-resistance rating of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
- Construction having a fire-resistance rating of not less than 2 hours.

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3008.8.2 Protection of wiring or cables

- Wires or cables that are located outside of the elevator hoistway, machine room, control room and control space and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, ventilation and fire-detecting systems to occupant evacuation elevators shall be protected using one of the following methods:

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3008.8.2 Protection of wiring or cables



- Exception:
- Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operation.

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3008.9 - Emergency voice/alarm communication system

- The building shall be provided with an emergency voice/alarm communication system. The emergency voice/alarm communication system shall be accessible to the fire department. The system shall be provided in accordance with Section 907.5.2.2.



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3008.10 Hazardous material areas

- Building areas shall not contain hazardous materials exceeding the maximum allowable quantities per control area as addressed in Section 414.2.



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3008.9.1 Notification appliances

- Not fewer than one audible and one visible notification appliance shall be installed within each occupant evacuation elevator lobby.



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508.3.1.1 High-rise buildings

- 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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1704.6.1 Structural observations for structures

- Structural observations shall be provided for those structures where one or more of the following conditions exist:
 1. The structure is classified as Risk Category III or IV.
 2. The structure is a high-rise building.



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901.6.2.1 High-rise buildings



- For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4.
- If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

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1705.18 Fire-resistant penetrations and joints

- In high-rise buildings, in buildings assigned to Risk Category III or IV, or in fire areas containing Group R occupancies with an occupant load greater than 250, special inspections for through-penetrations, membrane penetration firestops, fire-resistant joint systems and perimeter fire containment systems that are tested and listed in accordance with Sections 714.4.1.2, 714.5.1.2, 715.3.1 and 715.4 shall be in accordance with Section 1705.18.1 or 1705.18.2.



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907.6.4.2 High-rise buildings

Building Notification Signal	
Floor x+16	No Signal
Floor x+15	No Signal
Floor x+14	No Signal
Floor x+13	Alert Signal
Floor x+12	Evacuate to Refuge Level
Floor x+11	Evacuate to Refuge Level
Floor x+10	Alert Signal
Floor x+9	No Signal
Floor x+8	No Signal
Floor x+7	No Signal
Floor x+6	No Signal
Floor x+5	No Signal
Floor x+4	No Signal
Floor x+3	No Signal
Floor x+2	No Signal
Floor x+1	No Signal
Floor x	No Signal

Fire Floor

- In high-rise buildings, a separate zone by floor shall be provided for each of the following types of alarm-initiating devices where provided:
 1. Smoke detectors.
 2. Sprinkler waterflow devices.
 3. Manual fire alarm boxes.
 4. Other approved types of automatic fire protection systems.

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909.16 Fire fighter's smoke control panel

- A fire fighter's smoke control panel for fire department emergency response purposes only shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems.
- The panel shall be located in a fire command center complying with Section 911 in high-rise buildings or buildings with smoke-protected assembly seating.



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3006.2 Hoistway opening protection required

- Elevator hoistway door openings shall be protected in accordance with Section 3006.3 where an elevator hoistway connects more than three stories, is required to be enclosed within a shaft enclosure in accordance with Section 712.1.1 and any of the following conditions apply:
 - 5. The building is a high rise and the elevator hoistway is more than 75 feet in height. The height of the hoistway shall be measured from the lowest floor to the highest floor of the floors served by the hoistway.



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1027.2 Use in a means of egress

- Exterior exit stairways shall not be used as an element of a required means of egress for Group I-2 occupancies.
- For occupancies in other than Group I-2, exterior exit stairways and ramps shall be permitted as an element of a required means of egress for buildings not exceeding six stories above grade plane or that are not high-rise buildings.



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3006.2 Hoistway opening protection required

- Exceptions:
 1. Protection of elevator hoistway door openings is not required where the elevator serves only open parking garages in accordance with Section 406.5.
 2. Protection of elevator hoistway door openings is not required at the level(s) of exit discharge, provided that the level(s) of exit discharge is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.
 3. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required on levels where the elevator hoistway opens to the exterior.



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3006.3 Hoistway opening protection



- Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:
 1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway shaft enclosure doors from each floor by fire partitions in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for corridor walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1.

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3006.3 Hoistway opening protection



- 3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such door shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
- 4. The elevator hoistway shall be pressurized in accordance with Section 909.21.

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3006.3 Hoistway opening protection



- 2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway shaft enclosure doors from each floor by smoke partitions in accordance with Section 710 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. In addition, doors protecting openings in the smoke partitions shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1.

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3006.4 Means of egress

- Elevator lobbies shall be provided with not less than one means of egress complying with Chapter 10 and other provisions in this code.
- Egress through an enclosed elevator lobby shall be permitted in accordance with Item 1 of Section 1016.2.



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