

Chapter 7 Means of Egress

7.1 General.

7.1.1* Application. Means of egress for both new and existing buildings shall comply with this chapter. (See also 4.5.3.)

7.1.2 Special Definitions. A list of special terms used in this chapter follows:

- (1) **Accessible Area of Refuge.** See 3.3.18.1.
- (2) **Accessible Means of Egress.** See 3.3.151.1.
- (3) **Area of Refuge.** See 3.3.18.
- (4) **Common Path of Travel.** See 3.3.38.
- (5) **Electroluminescent.** See 3.3.57.
- (6) **Elevator Evacuation System.** See 3.3.242.1.
- (7) **Elevator Lobby.** See 3.3.59.
- (8) **Elevator Lobby Door.** See 3.3.52.1.
- (9) **Exit.** See 3.3.70.
- (10) **Exit Access.** See 3.3.71.
- (11) **Exit Discharge.** See 3.3.72.
- (12) **Externally Illuminated.** See 3.3.126.1.
- (13) **Horizontal Exit.** See 3.3.70.1.
- (14) **Internally Illuminated.** See 3.3.126.2.
- (15) **Means of Egress.** See 3.3.151.
- (16) **Photoluminescent.** See 3.3.182.
- (17) **Ramp.** See 3.3.194.
- (18) **Self-Luminous.** See 3.3.211.
- (19) **Severe Mobility Impairment.** See 3.3.216.
- (20) **Smokeproof Enclosure.** See 3.3.226.

7.1.3 Separation of Means of Egress. See also Section 8.2.

7.1.3.1 Exit Access Corridors. Corridors used as exit access and serving an area having an occupant load exceeding 30 shall be separated from other parts of the building by walls having

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not less than a 1-hour fire resistance rating in accordance with Section 8.3, unless otherwise permitted by the following:

- (1) This requirement shall not apply to existing buildings, provided that the occupancy classification does not change.
- (2) This requirement shall not apply where otherwise provided in Chapter 12 through Chapter 42.

7.1.3.2 Exits.

7.1.3.2.1 Where this *Code* requires an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.2 and the following:

- (1)* The separation shall have not less than a 1-hour fire resistance rating where the exit connects three stories or less.
- (2)* The separation shall have not less than a 2-hour fire resistance rating where the exit connects four or more stories, unless one of the following conditions exists:
 - (a) In existing non-high-rise buildings, existing exit stair enclosures shall have not less than a 1-hour fire resistance rating.
 - (b) In existing buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, existing exit stair enclosures shall have not less than a 1-hour fire resistance rating.
 - (c) One-hour enclosures in accordance with 28.2.2.1.2, 29.2.2.1.2, 30.2.2.1.2, and 31.2.2.1.2 shall be permitted as an alternative to the requirement of 7.1.3.2.1(2).
- (3) The 2-hour fire resistance-rated separation required by 7.1.3.2.1(2) shall be constructed of an assembly of noncombustible or limited-combustible materials and shall be supported by construction having not less than a 2-hour fire resistance rating. In Type III, Type IV, and Type V construction, fire-retardant-treated wood enclosed in noncombustible or limited-combustible materials shall be permitted.
- (4) Openings in the separation shall be protected by fire door assemblies equipped with door closers complying with 7.2.1.8.
- (5)* Openings in exit enclosures shall be limited to doors from normally occupied spaces and corridors and doors for egress from the enclosure, unless one of the following conditions exists:
 - (a) Openings in exit passageways in mall buildings as provided in Chapter 36 and Chapter 37 shall be permitted.
 - (b) In buildings of Type I or Type II construction, existing fire protection-rated doors to interstitial spaces shall be permitted, provided that such spaces meet all of the following criteria:

- i. The space is used solely for distribution of pipes, ducts, and conduits.
 - ii. The space contains no storage.
 - iii. The space is separated from the exit enclosure in accordance with Section 8.3.
 - (c) Existing openings to mechanical equipment spaces protected by approved existing fire protection-rated doors shall be permitted, provided that the following criteria are met:
 - i. The space is used solely for non-fuel-fired mechanical equipment.
 - ii. The space contains no storage of combustible materials.
 - iii. The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
- (6) Penetrations into, and openings through, an exit enclosure assembly shall be limited to the following:
 - (a) Doors permitted by 7.1.3.2.1(5)
 - (b)* Electrical conduit serving the stairway
 - (c) Required exit doors
 - (d) Ductwork and equipment necessary for independent stair pressurization
 - (e) Water or steam piping necessary for the heating or cooling of the exit enclosure
 - (f) Sprinkler piping
 - (g) Standpipes
 - (h) Existing penetrations protected in accordance with 8.3.5
 - (i) Penetrations for fire alarm circuits, where the circuits are installed in metal conduit and the penetrations are protected in accordance with 8.3.5
- (7) Penetrations or communicating openings shall be prohibited between adjacent exit enclosures.

7.1.3.2.2 An exit enclosure shall provide a continuous protected path of travel to an exit discharge.

7.1.3.2.3* An exit enclosure shall not be used for any purpose that has the potential to interfere with its use as an exit and, if so designated, as an area of refuge. (*See also 7.2.2.5.3.*)

7.1.4 Interior Finish in Exit Enclosures.

7.1.4.1* Interior Wall and Ceiling Finish in Exit Enclosures. Interior wall and ceiling finish shall be in accordance with Section 10.2. In exit enclosures, interior wall and ceiling finish

materials complying with Section 10.2 shall be Class A or Class B.

7.1.4.2* Interior Floor Finish in Exit Enclosures. New interior floor finish in exit enclosures, including stair treads and risers, shall be not less than Class II in accordance with Section 10.2.

7.1.5* Headroom.

7.1.5.1 Means of egress shall be designed and maintained to provide headroom in accordance with other sections of this *Code*, and such headroom shall be not less than 7 ft 6 in. (2285 mm), with projections from the ceiling not less than 6 ft 8 in. (2030 mm) nominal above the finished floor, unless otherwise specified in 7.1.5.1.1 and 7.1.5.1.2.

7.1.5.1.1 In existing buildings, the ceiling height shall be not less than 7 ft (2135 mm) from the floor, with projections from the ceiling not less than 6 ft 8 in. (2030 mm) nominal above the floor.

7.1.5.1.2 Headroom in industrial equipment access areas as provided in 40.2.5.2 shall be permitted.

7.1.5.2 The minimum ceiling height shall be maintained for not less than two-thirds of the ceiling area of any room or space, provided that the ceiling height of remaining ceiling area is not less than 6 ft 8 in. (2030 mm).

7.1.5.3 Headroom on stairs shall be not less than 6 ft 8 in. (2030 mm) and shall be measured vertically above a plane parallel to and tangent with the most forward projection of the stair tread.

7.1.6 Walking Surfaces in the Means of Egress.

7.1.6.1 General.

7.1.6.1.1 Walking surfaces in the means of egress shall comply with 7.1.6.2 through 7.1.6.4.

7.1.6.1.2 Approved, existing walking surfaces shall be permitted.

7.1.6.2 Changes in Elevation. Abrupt changes in elevation of walking surfaces shall not exceed ¼ in. (6.3 mm). Changes in elevation exceeding ¼ in. (6.3 mm), but not exceeding ½ in. (13 mm), shall be beveled 1 to 2. Changes in elevation exceeding ½ in. (13 mm) shall be considered a change in level and shall be subject to the requirements of 7.1.7.

7.1.6.3 Level.

7.1.6.3.1 Walking surfaces shall comply with the following:

- (1) Walking surfaces shall be nominally level.
- (2) The slope of a walking surface in the direction of travel shall not exceed 1 in 20, unless the ramp requirements of 7.2.5 are met.
- (3) The slope perpendicular to the direction of travel shall not exceed 1 in 48.

7.1.6.4* Slip Resistance. Walking surfaces shall be slip resistant under foreseeable conditions. The walking surface of each element in the means of egress shall be uniformly slip resistant along the natural path of travel.

7.1.7 Changes in Level in Means of Egress.

7.1.7.1 Changes in level in means of egress shall be achieved by an approved means of egress where the elevation difference exceeds 21 in. (535 mm).

7.1.7.2* Changes in level in means of egress not in excess of 21 in. (535 mm) shall be achieved either by a ramp complying with the requirements of 7.2.5 or by a stair complying with the requirements of 7.2.2.

7.1.7.2.1 Where a ramp is used, the presence and location of ramped portions of walkways shall be readily apparent.

7.1.7.2.2 Where a stair is used, the tread depth of such stair shall be not less than 13 in. (330 mm).

7.1.7.2.3 Tread depth in industrial equipment access areas as provided in 40.2.5.2 shall be permitted.

7.1.7.2.4 The presence and location of each step shall be readily apparent.

7.1.8* Guards. Guards in accordance with 7.2.2.4 shall be provided at the open sides of means of egress that exceed 30 in. (760 mm) above the floor or grade below.

7.1.9 Impediments to Egress. Any device or alarm installed to restrict the improper use of a means of egress shall be designed and installed so that it cannot, even in case of failure, impede or prevent emergency use of such means of egress, unless otherwise provided in 7.2.1.6 and Chapters 18, 19, 22, and 23.

7.1.10 Means of Egress Reliability.

7.1.10.1* General. Means of egress shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

7.1.10.2 Furnishings and Decorations in Means of Egress.

7.1.10.2.1 No furnishings, decorations, or other objects shall obstruct exits, access thereto, egress therefrom, or visibility thereof.

7.1.10.2.2 No obstruction by railings, barriers, or gates shall divide the means of egress into sections appurtenant to individual rooms, apartments, or other occupied spaces. Where the authority having jurisdiction finds the required path of travel to be obstructed by furniture or other movable objects, the authority shall be permitted to require that such objects be secured out of the way or shall be permitted to require that railings or other permanent barriers be installed to protect the path of travel against encroachment.

7.1.10.2.3 Mirrors shall not be placed on exit doors. Mirrors shall not be placed in or adjacent

to any exit in such a manner as to confuse the direction of egress.

7.1.11 Sprinkler System Installation. Where another provision of this chapter requires an automatic sprinkler system, the sprinkler system shall be installed in accordance with the subparts of 9.7.1.1 permitted by the applicable occupancy chapters.

7.2 Means of Egress Components.

7.2.1 Doors.

7.2.1.1 General.

7.2.1.1.1 A door assembly in a means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.1. Such an assembly shall be designated as a door.

7.2.1.1.2 Every door and every principal entrance that is required to serve as an exit shall be designed and constructed so that the path of egress travel is obvious and direct. Windows that, because of their physical configuration or design and the materials used in their construction, have the potential to be mistaken for doors shall be made inaccessible to the occupants by barriers or railings.

7.2.1.1.3* For the purposes of Section 7.2, a building shall be considered to be occupied at any time it is open for general occupancy, at any time it is open to the public, or at any other time it is occupied by more than 10 persons.

7.2.1.2 Width.

7.2.1.2.1* Egress Capacity Width. For purposes of calculating capacity, the width of doors shall be measured as follows:

- (1) For new swinging doors, only the width of the doorway when the door is open 90 degrees, as measured in accordance with 7.2.1.2.1(4) and 7.2.1.2.1(5), shall be included.
- (2) For other types of new doors, only the width of the doorway when the door is in the fully open position, as measured in accordance with 7.2.1.2.1(4) and 7.2.1.2.1(5), shall be included.
- (3) For any existing door installation, only the width of the doorway when the door is in the fully open position, as measured in accordance with 7.2.1.2.1(4) and 7.2.1.2.1(5), shall be included.
- (4) For all doors, projections not more than 3½ in. (90 mm) at each side of the doorway at a height of not more than 38 in. (965 mm) shall not be considered a reduction in egress capacity width.
- (5) For swinging doors, egress capacity width shall be measured between the face of the door and the stop.

7.2.1.2.2 Clear Width. Clear width shall be measured as follows:

- (1) At the narrowest point in the door opening
- (2) For swinging doors, between the face of the door and the stop
- (3) Without subtracting for the obstructions permitted by 7.2.1.2.3.2 and 7.2.1.2.3.3

7.2.1.2.3* Measurement.

7.2.1.2.3.1 For purposes of determining minimum door width, the clear width shall be used unless door leaf width is specified.

7.2.1.2.3.2 For swinging doors, projections of not more than 4 in. (100 mm) into the doorway width on the hinge side shall not be considered reductions in width, provided that such projections are for purposes of accommodating panic hardware or fire exit hardware and are located not less than 34 in. (865 mm) above the floor.

7.2.1.2.3.3 Projections exceeding 6 ft 8 in. (2030 mm) above the floor shall not be considered reductions in width.

7.2.1.2.4 Minimum Door Width. Door openings in means of egress shall be not less than 32 in. (810 mm) in clear width, unless one of the following conditions exists:

- (1) Where a pair of doors is provided, not less than one of the doors shall provide not less than a 32-in. (810-mm) clear width opening.
- (2) Exit access doors serving a room not exceeding 70 ft² (6.5 m²) and not required to be accessible to persons with severe mobility impairments shall be not less than 24 in. (610 mm) in door leaf width.
- (3) Doors serving a building or portion thereof not required to be accessible to persons with severe mobility impairments shall be permitted to be 28 in. (710 mm) in door leaf width.
- (4) In existing buildings, the existing door leaf width shall be not less than 28 in. (710 mm).
- (5) Doors in detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23 shall not be required to comply with 7.2.1.2.4.
- (6) Interior doors in dwelling units as otherwise provided in Chapter 24 shall not be required to comply with 7.2.1.2.4.
- (7) A power-operated door leaf located within a two-leaf opening shall be exempt from the minimum 32-in. (810-mm) single-leaf requirement in accordance with 7.2.1.9.1.5.
- (8) Revolving doors as provided in 7.2.1.10 shall be exempt from the minimum 32-in. (810-mm) width requirement.
- (9)* Where a single door is provided for discharge from a stairway required to comply with 7.2.2.2.1.2(B) and such door serves as the sole means of exit discharge from such

stairway, the clear width of the door opening, measured in accordance with 7.2.1.2.2, shall be not less than two-thirds the nominal width of the stairway.

7.2.1.3 Floor Level.

7.2.1.3.1 The elevation of the floor surfaces on both sides of a door shall not vary by more than ½ in. (13 mm), unless otherwise permitted by 7.2.1.3.5 or 7.2.1.3.6.

7.2.1.3.2 The elevation of the floor surfaces required by 7.2.1.3.1 shall be maintained on both sides of the doorway for a distance not less than the width of the widest leaf.

7.2.1.3.3 Thresholds at doorways shall not exceed ½ in. (13 mm) in height.

7.2.1.3.4 Raised thresholds and floor level changes in excess of ¼ in. (6.3 mm) at doorways shall be beveled with a slope not steeper than 1 in 2.

7.2.1.3.5 In existing buildings, where the door discharges to the outside or to an exterior balcony or exterior exit access, the floor level outside the door shall be permitted to be one step lower than that of the inside, but shall be not more than 8 in. (205 mm) lower.

7.2.1.3.6 In existing buildings, a door at the top of a stair shall be permitted to open directly at a stair, provided that the door does not swing over the stair and that the door serves an area with an occupant load of fewer than 50 persons.

7.2.1.4 Swing and Force to Open.

7.2.1.4.1* Any door in a means of egress shall be of the side-hinged or pivoted-swinging type, and shall be installed to be capable of swinging from any position to the full required width of the opening in which it is installed, unless otherwise specified in 7.2.1.4.1.1 through 7.2.1.4.1.9.

7.2.1.4.1.1 Sliding doors in detention and correctional occupancies, as provided in Chapter 22 and Chapter 23, shall be permitted.

7.2.1.4.1.2 Doors in dwelling units, as provided in Chapter 24, shall be permitted.

7.2.1.4.1.3 Doors in residential board and care occupancies, as provided in Chapter 32 and Chapter 33, shall be permitted.

7.2.1.4.1.4 Where permitted in Chapter 12 through Chapter 42, horizontal-sliding or vertical-rolling security grilles or doors that are part of the required means of egress shall be permitted, provided that they meet the following criteria:

- (1) Such grilles or doors shall remain secured in the fully open position during the period of occupancy by the general public.
- (2) On or adjacent to the grille or door, there shall be a readily visible, durable sign in letters not less than 1 in. (25 mm) high on a contrasting background that reads as follows: THIS DOOR TO REMAIN OPEN WHEN THE BUILDING IS OCCUPIED.

- (3) Doors or grilles shall not be brought to the closed position when the space is occupied.
- (4) Doors or grilles shall be operable from within the space without the use of any special knowledge or effort.
- (5) Where two or more means of egress are required, not more than half of the means of egress shall be equipped with horizontal-sliding or vertical-rolling grilles or doors.

7.2.1.4.1.5 Horizontal-sliding doors complying with 7.2.1.14 shall be permitted.

7.2.1.4.1.6 Horizontal-sliding doors serving a room or area with an occupant load of fewer than 10 in health care occupancies shall be exempt from the requirements of 7.2.1.4.1 as provided in Chapter 18 or Chapter 19.

7.2.1.4.1.7 Where private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10 contain only low or ordinary hazard contents, doors to such areas shall be exempt from the requirement of 7.2.1.4.1.

7.2.1.4.1.8 Revolving doors complying with 7.2.1.10 shall be permitted.

7.2.1.4.1.9 Existing fusible link–operated horizontal-sliding or vertical-rolling fire doors shall be permitted to be used as provided in Chapter 12 through Chapter 42.

7.2.1.4.2 Doors required to be of the side-hinged or pivoted-swinging type shall swing in the direction of egress travel where serving a room or area with an occupant load of 50 or more, except under the following conditions:

- (1) Doors in horizontal exits shall not be required to swing in the direction of egress travel where permitted by 7.2.4.3.7.1 or 7.2.4.3.7.2.
- (2) Smoke barrier doors shall not be required to swing in the direction of egress travel in existing health care occupancies as provided in Chapter 19.

7.2.1.4.3 A door shall swing in the direction of egress travel under either of the following conditions:

- (1) Where the door is used in an exit enclosure, unless the door is the door of an individual living unit that opens directly into an exit enclosure
- (2) Where the door serves a high hazard contents area

7.2.1.4.4* During its swing, any door in a means of egress shall leave not less than one-half of the required width of an aisle, a corridor, a passageway, or a landing unobstructed and shall project not more than 7 in. (180 mm) into the required width of an aisle, a corridor, a passageway, or a landing, when fully open, unless both of the following conditions are met:

- (1) The door provides access to a stair in an existing building.
- (2) The door meets the requirement that limits projection to not more than 7 in. (180 mm) into the required width of the stair landing when the door is fully open.

7.2.1.4.5 The forces required to fully open any door manually in a means of egress shall not exceed 15 lbf (67 N) to release the latch, 30 lbf (133 N) to set the door in motion, and 15 lbf (67 N) to open the door to the minimum required width, unless otherwise specified in 7.2.1.4.5.2 through 7.2.1.4.5.5.

7.2.1.4.5.1 The forces specified in 7.2.1.4.5 shall be applied to the latch stile.

7.2.1.4.5.2 Opening forces for interior side-hinged or pivoted-swinging doors without closers shall not exceed 5 lbf (22 N).

7.2.1.4.5.3 The opening force for existing doors in existing buildings shall not exceed 50 lbf (222 N) applied to the latch stile.

7.2.1.4.5.4 The opening forces for horizontal-sliding doors in detention and correctional occupancies shall be as provided in Chapter 22 and Chapter 23.

7.2.1.4.5.5 The opening forces for power-operated doors shall be as provided in 7.2.1.9.

7.2.1.4.6 Screen doors and storm doors used in a means of egress shall be subject to the requirements for direction of swing that are applicable to other doors used in a means of egress.

7.2.1.5 Locks, Latches, and Alarm Devices.

7.2.1.5.1 Doors shall be arranged to be opened readily from the egress side whenever the building is occupied.

7.2.1.5.2 Locks, if provided, shall not require the use of a key, a tool, or special knowledge or effort for operation from the egress side.

7.2.1.5.3 The requirements of 7.2.1.5.1 and 7.2.1.5.2 shall not apply where otherwise provided in Chapter 18 through Chapter 23.

7.2.1.5.4 Exterior doors shall be permitted to have key-operated locks from the egress side, provided that the following criteria are met:

- (1) This alternative is permitted in Chapter 12 through Chapter 42 for the specific occupancy.
- (2) A readily visible, durable sign in letters not less than 1 in. (25 mm) high on a contrasting background that reads as follows is located on or adjacent to the door: THIS DOOR TO REMAIN UNLOCKED WHEN THE BUILDING IS OCCUPIED.
- (3) The locking device is of a type that is readily distinguishable as locked.
- (4) A key is immediately available to any occupant inside the building when it is locked.

7.2.1.5.5 The alternative provisions of 7.2.1.5.4 shall be permitted to be revoked by the authority having jurisdiction for cause.

7.2.1.5.6 Where permitted in Chapter 12 through Chapter 42, key operation shall be permitted, provided that the key cannot be removed when the door is locked from the side from which

egress is to be made.

7.2.1.5.7* Every door in a stair enclosure serving more than four stories, unless permitted by 7.2.1.5.7.2, shall meet one of the following:

- (1) Re-entry from the stair enclosure to the interior of the building shall be provided.
- (2) An automatic release that is actuated with the initiation of the building fire alarm system shall be provided to unlock all stair enclosure doors to allow re-entry.
- (3) Selected re-entry shall be provided in accordance with 7.2.1.5.7.1.

7.2.1.5.7.1 Doors on stair enclosures shall be permitted to be equipped with hardware that prevents re-entry into the interior of the building, provided that the following criteria are met:

- (1) There shall be not less than two levels where it is possible to leave the stair enclosure to access another exit.
- (2) There shall be not more than four stories intervening between stories where it is possible to leave the stair enclosure to access another exit.
- (3) Re-entry shall be possible on the top story or next-to-top story served by the stair enclosure, and such story shall allow access to another exit.
- (4) Doors allowing re-entry shall be identified as such on the stair side of the door.
- (5) Doors not allowing re-entry shall be provided with a sign on the stair side indicating the location of the nearest door, in each direction of travel, that allows re-entry or exit.

7.2.1.5.7.2 The requirement of 7.2.1.5.7 shall not apply to the following:

- (1) Existing installations as permitted in Chapter 12 through Chapter 42
- (2) Stair enclosures serving a building permitted to have a single exit in accordance with Chapter 11 through Chapter 42
- (3) Stair enclosures in health care occupancies where otherwise provided in Chapter 18
- (4) Stair enclosures in detention and correctional occupancies where otherwise provided in Chapter 22

7.2.1.5.8 If a stair enclosure allows access to the roof of the building, the door to the roof either shall be kept locked or shall allow re-entry from the roof.

7.2.1.5.9* A latch or other fastening device on a door shall be provided with a releasing device that has an obvious method of operation and that is readily operated under all lighting conditions.

7.2.1.5.9.1 The releasing mechanism for any latch other than existing installations shall be located not less than 34 in. (865 mm), and not more than 48 in. (1220 mm), above the finished floor.

7.2.1.5.9.2 The releasing mechanism shall open the door with not more than one releasing operation, unless otherwise specified in 7.2.1.5.9.3 and 7.2.1.5.9.4.

7.2.1.5.9.3* Egress doors from individual living units and guest rooms of residential occupancies shall be permitted to be provided with devices, including automatic latching devices, that require not more than one additional releasing operation, provided that such device is operable from the inside without the use of a key or tool and is mounted at a height not exceeding 48 in. (1220 mm) above the finished floor.

7.2.1.5.9.4 Existing security devices permitted by 7.2.1.5.9.3 shall be permitted to have two additional releasing operations.

7.2.1.5.9.5 Existing security devices permitted by 7.2.1.5.9.3, other than automatic latching devices, shall be located not more than 60 in. (1525 mm) above the finished floor.

7.2.1.5.10 Where pairs of doors are required in a means of egress, one of the following criteria shall be met:

- (1) Each leaf of the pair shall be provided with a releasing device that does not depend on the release of one door before the other.
- (2) Approved automatic flush bolts shall be used and arranged such that the following criteria are met:
 - (a) The door leaf equipped with the automatic flush bolts shall have no doorknob or surface-mounted hardware.
 - (b) Unlatching of any leaf shall not require more than one operation.

7.2.1.5.11* Devices shall not be installed in connection with any door on which panic hardware or fire exit hardware is required where such devices prevent or are intended to prevent the free use of the door for purposes of egress, unless otherwise provided in 7.2.1.6.

7.2.1.6 Special Locking Arrangements.

7.2.1.6.1 Delayed-Egress Locks. Approved, listed, delayed-egress locks shall be permitted to be installed on doors serving low and ordinary hazard contents in buildings protected throughout by an approved, supervised automatic fire detection system in accordance with Section 9.6 or an approved, supervised automatic sprinkler system in accordance with Section 9.7, and where permitted in Chapter 12 through Chapter 42, provided that the following criteria are met:

- (1) The provisions of 7.2.1.6.2 for access-controlled egress doors shall not apply to doors with delayed-egress locks.
- (2) The doors shall unlock upon actuation of one of the following:
 - (a) Approved, supervised automatic sprinkler system in accordance with Section 9.7
 - (b) Not more than one heat detector of an approved, supervised automatic fire

detection system in accordance with Section 9.6

- (c) Not more than two smoke detectors of an approved, supervised automatic fire detection system in accordance with Section 9.6
- (3) The doors shall unlock upon loss of power controlling the lock or locking mechanism.
- (4)* An irreversible process shall release the lock within 15 seconds, or 30 seconds where approved by the authority having jurisdiction, upon application of a force to the release device required in 7.2.1.5.9 under the following conditions:
 - (a) The force shall not be required to exceed 15 lbf (67 N).
 - (b) The force shall not be required to be continuously applied for more than 3 seconds.
 - (c) The initiation of the release process shall activate an audible signal in the vicinity of the door.
 - (d) Once the door lock has been released by the application of force to the releasing device, relocking shall be by manual means only.
- (5)* A readily visible, durable sign in letters not less than 1 in. (25 mm) high and not less than $\frac{1}{8}$ in. (3.2 mm) in stroke width on a contrasting background that reads as follows shall be located on the door adjacent to the release device:

PUSH UNTIL ALARM SOUNDS

DOOR CAN BE OPENED IN 15 SECONDS

7.2.1.6.2* Access-Controlled Egress Doors. Where permitted in Chapters 11 through 42, doors in the means of egress shall be permitted to be equipped with an approved entrance and egress access control system, provided that all the following criteria are met:

- (1) A sensor shall be provided on the egress side, arranged to detect an occupant approaching doors that are arranged to unlock in the direction of egress upon detection of an approaching occupant or loss of power to the sensor.
- (2) Loss of power to the part of the access control system that locks the doors shall automatically unlock the doors in the direction of egress.
- (3) The doors shall be arranged to unlock in the direction of egress from a manual release device located 40 in. to 48 in. (1015 mm to 1220 mm) vertically above the floor and within 60 in. (1525 mm) of the secured doors.
- (4) The manual release device specified in 7.2.1.6.2(3) shall be readily accessible and clearly identified by a sign that reads as follows: PUSH TO EXIT.
- (5) When operated, the manual release device shall result in direct interruption of power to the lock — independent of the access control system electronics — and the doors shall remain unlocked for not less than 30 seconds.

- (6) Activation of the building fire-protective signaling system, if provided, shall automatically unlock the doors in the direction of egress, and the doors shall remain unlocked until the fire-protective signaling system has been manually reset.
- (7) The activation of manual fire alarm boxes that activate the building fire protective signaling system specified in 7.2.1.6.2(6) shall not be required to unlock the doors.
- (8) Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically unlock the doors in the direction of egress, and the doors shall remain unlocked until the fire-protective signaling system has been manually reset.

7.2.1.7 Panic Hardware and Fire Exit Hardware.

7.2.1.7.1 Where a door is required to be equipped with panic or fire exit hardware, such hardware shall meet the following criteria:

- (1) It shall consist of a cross bar or a push pad, the actuating portion of which extends across not less than one-half of the width of the door leaf.
- (2) It shall be mounted as follows:
 - (a) New installations shall be not less than 34 in. (865 mm), nor more than 48 in. (1220 mm), above the floor.
 - (b) Existing installations shall be not less than 30 in. (760 mm), nor more than 48 in. (1220 mm), above the floor.
- (3) It shall be constructed so that a horizontal force not to exceed 15 lbf (66 N) actuates the cross bar or push pad and latches.

7.2.1.7.2 Only approved panic hardware shall be used on doors that are not fire doors. Only approved fire exit hardware shall be used on fire doors.

7.2.1.7.3 Required panic hardware and fire exit hardware, in other than detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23, shall not be equipped with any locking device, set screw, or other arrangement that prevents the release of the latch when pressure is applied to the releasing device.

7.2.1.7.4 Devices that hold the latch in the retracted position shall be prohibited on fire exit hardware, unless such devices are listed and approved for such a purpose.

7.2.1.8 Self-Closing Devices.

7.2.1.8.1* A door normally required to be kept closed shall not be secured in the open position at any time and shall be self-closing or automatic-closing in accordance with 7.2.1.8.2, unless otherwise permitted by 7.2.1.8.3.

7.2.1.8.2 In any building of low or ordinary hazard contents, as defined in 6.2.2.2 and 6.2.2.3, or where approved by the authority having jurisdiction, doors shall be permitted to be automatic-closing, provided that the following criteria are met:

- (1) Upon release of the hold-open mechanism, the door becomes self-closing.
- (2) The release device is designed so that the door instantly releases manually and, upon release, becomes self-closing, or the door can be readily closed.
- (3) The automatic releasing mechanism or medium is activated by the operation of approved smoke detectors installed in accordance with the requirements for smoke detectors for door release service in *NFPA 72, National Fire Alarm Code*.
- (4) Upon loss of power to the hold-open device, the hold-open mechanism is released and the door becomes self-closing.
- (5) The release by means of smoke detection of one door in a stair enclosure results in closing all doors serving that stair.

7.2.1.8.3 The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with the requirements of 9.4.3 shall be permitted to remain open during Phase I Emergency Recall Operation.

7.2.1.9* Powered Doors.

7.2.1.9.1* General. Where means of egress doors are operated by power upon the approach of a person or are provided with power-assisted manual operation, the design shall be such that, in the event of power failure, the doors open manually to allow egress travel or close when necessary to safeguard the means of egress.

7.2.1.9.1.1 The forces required to manually open the doors specified in 7.2.1.9.1 shall not exceed those required in 7.2.1.4.5, except that the force required to set the door in motion shall not exceed 50 lbf (222 N).

7.2.1.9.1.2 The door shall be designed and installed so that, when a force is applied to the door on the side from which egress is made, it shall be capable of swinging from any position to provide full use of the required width of the opening in which it is installed. (*See 7.2.1.4.*)

7.2.1.9.1.3 A readily visible, durable sign in letters not less than 1 in. (25 mm) high on a contrasting background that reads as follows shall be located on the egress side of each door:

IN EMERGENCY, PUSH TO OPEN

7.2.1.9.1.4 Sliding, power-operated doors in exit access serving an occupant load of fewer than 50 that manually open in the direction of door travel with forces not exceeding those required in 7.2.1.4.5 shall not be required to have the swing-out feature required by 7.2.1.9.1.2. The required sign shall be in letters not less than 1 in. (25 mm) high on a contrasting background and shall read as follows:

IN EMERGENCY, SLIDE TO OPEN

7.2.1.9.1.5* In the emergency breakout mode, a door leaf located within a two-leaf opening shall be exempt from the minimum 32-in. (810-mm) single-leaf requirement of 7.2.1.2.4,

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provided that the clear width of the single leaf is not less than 30 in. (760 mm).

7.2.1.9.1.6 For a biparting sliding door in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-in. (810-mm) single-leaf requirement of 7.2.1.2.4 if a clear opening of not less than 32 in. (810 mm) is provided by all leaves broken out.

7.2.1.9.1.7 Doors complying with 7.2.1.14 shall be permitted to be used.

7.2.1.9.1.8 The requirements of 7.2.1.9.1 through 7.2.1.9.1.7 shall not apply in detention and correctional occupancies where otherwise provided in Chapter 22 and Chapter 23.

7.2.1.9.2 Doors Required to Be Self-Closing. Where doors are required to be self-closing and are operated by power upon the approach of a person, or are provided with power-assisted manual operation, they shall be permitted in the means of egress where they meet the following criteria:

- (1) The doors can be opened manually in accordance with 7.2.1.9.1 to allow egress travel in the event of power failure.
- (2) New doors remain in the closed position unless actuated or opened manually.
- (3) When actuated, new doors remain open for not more than 30 seconds.
- (4) Doors held open for any period of time close — and the power-assist mechanism ceases to function — upon operation of approved smoke detectors installed in such a way as to detect smoke on either side of the door opening in accordance with the provisions of *NFPA 72, National Fire Alarm Code*.
- (5) Doors required to be self-latching are either self-latching or become self-latching upon operation of approved smoke detectors per 7.2.1.9.2(4).
- (6) New power-assisted swinging doors comply with BHMA/ANSI A156.19, *American National Standard for Power Assist and Low Energy Power Operated Doors*.

7.2.1.10 Revolving Doors.

7.2.1.10.1 Revolving doors, whether used or not used in the means of egress, shall comply with the following:

- (1) Revolving doors shall be capable of being collapsed into a book-fold position, unless they are existing revolving doors approved by the authority having jurisdiction.
- (2) When revolving doors are collapsed into the book-fold position, the parallel egress paths formed shall provide an aggregate width of 36 in. (915 mm), unless they are approved, existing revolving doors.
- (3) Revolving doors shall not be used within 10 ft (3050 mm) of the foot or the top of stairs or escalators.
- (4) A dispersal area acceptable to the authority having jurisdiction shall be located between

stairs or escalators and the revolving door.

- (5) The revolutions per minute (rpm) of revolving doors shall not exceed the values in Table 7.2.1.10.1.
- (6) Each revolving door shall have a conforming side-hinged swinging door in the same wall as the revolving door and within 10 ft (3050 mm) of the revolving door, unless one of the following conditions applies:
 - (a) Revolving doors shall be permitted without adjacent swinging doors, as required by 7.2.1.10.1(6), in street floor elevator lobbies, provided that no stairways or doors from other parts of the building discharge through the lobby and the lobby has no occupancy other than as a means of travel between the elevators and street.
 - (b) The requirement of 7.2.1.10.1(6) shall not apply to existing revolving doors where the number of revolving doors does not exceed the number of swinging doors within 20 ft (6100 mm) of the revolving door.

Table 7.2.1.10.1 Revolving Door Maximum Speed

Inside Diameter		Power-Driven Speed Control (rpm)	Manual Speed Control (rpm)
ft/in.	mm		
6 ft 6 in.	1980	11	12
7 ft	2135	10	11
7 ft 6 in.	2285	9	11
8 ft	2440	9	10
8 ft 6 in.	2590	8	9
9 ft	2745	8	9
9 ft 6 in.	2895	7	8
10 ft	3050	7	8

7.2.1.10.2 Where permitted in Chapter 12 through Chapter 42, revolving doors shall be permitted as a component in a means of egress, provided that the following criteria are met:

- (1) Revolving doors shall not be given credit for more than 50 percent of the required egress capacity.
- (2) Each revolving door shall not be credited with more than a 50-person capacity or, if of not less than a 9-ft (2745-mm) diameter, a revolving door shall be permitted egress capacity based on the clear opening width provided when collapsed into a book-fold position.
- (3) Revolving doors shall be capable of being collapsed into a book-fold position when a

force not exceeding 130 lbf (580 N) is applied to the wings within 3 in. (75 mm) of the outer edge.

7.2.1.10.3 Revolving doors not used as a component of a means of egress shall have a collapsing force not exceeding 180 lbf (800 N).

7.2.1.10.4 The requirement of 7.2.1.10.3 shall not apply to revolving doors, provided that the collapsing force is reduced to a force not to exceed 130 lbf (580 N) under the following conditions:

- (1) Power failure, or removal of power to the device holding the wings in position
- (2) Actuation of the automatic sprinkler system, where such a system is provided
- (3) Actuation of a smoke detection system that is installed to provide coverage in all areas within the building that are within 75 ft (23 m) of the revolving doors
- (4) Actuation of a clearly identified manual control switch in an approved location that reduces the holding force to a force not to exceed 130 lbf (580 N)

7.2.1.11 Turnstiles.

7.2.1.11.1 Turnstiles or similar devices that restrict travel to one direction or are used to collect fares or admission charges shall not be placed so as to obstruct any required means of egress, unless otherwise specified in 7.2.1.11.1.1 and 7.2.1.11.1.2.

7.2.1.11.1.1 Approved turnstiles not exceeding 39 in. (990 mm) in height that turn freely in the direction of egress travel shall be permitted where revolving doors are permitted in Chapter 12 through Chapter 42.

7.2.1.11.1.2 Where turnstiles are approved by the authority having jurisdiction and permitted in Chapter 12 through Chapter 42, each turnstile shall be credited for a capacity of 50 persons, provided that such turnstiles meet the following criteria:

- (1) They freewheel in the egress direction when primary power is lost, and freewheel in the direction of egress travel upon manual release by an employee assigned in the area.
- (2) They are not given credit for more than 50 percent of the required egress width.
- (3) They are not in excess of 39 in. (990 mm) in height and have a clear width of not less than 16½ in. (420 mm).

7.2.1.11.2 Turnstiles exceeding 39 in. (990 mm) in height shall meet the requirements for revolving doors in 7.2.1.10.

7.2.1.11.3 Turnstiles located in, or furnishing access to, required exits shall provide not less than 16½ in. (420 mm) clear width at and below a height of 39 in. (990 mm) and at least 22 in. (560 mm) clear width at heights above 39 in. (990 mm).

7.2.1.12 Doors in Folding Partitions. Where permanently mounted folding or movable partitions divide a room into smaller spaces, a swinging door or open doorway shall be

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provided as an exit access from each such space, unless otherwise specified in 7.2.1.12.1 and 7.2.1.12.2.

7.2.1.12.1 A door or opening in the folding partition shall not be required, provided that all of the following criteria are met:

- (1) The subdivided space is not used by more than 20 persons at any time.
- (2) The use of the space is under adult supervision.
- (3) The partitions are arranged so that they do not extend across any aisle or corridor used as an exit access to the required exits from the story.
- (4) The partitions conform to the interior finish and other requirements of this *Code*.
- (5) The partitions are of an approved type, have a simple method of release, and are capable of being opened quickly and easily by experienced persons in case of emergency.

7.2.1.12.2 Where a subdivided space is provided with not less than two means of egress, the swinging door in the folding partition specified in 7.2.1.12 shall not be required, and one such means of egress shall be permitted to be equipped with a horizontal-sliding door complying with 7.2.1.14.

7.2.1.13 Balanced Doors. If panic hardware is installed on balanced doors, the panic hardware shall be of the push-pad type, and the pad shall not extend more than approximately one-half the width of the door, measured from the latch side. [See 7.2.1.7.1(1).]

7.2.1.14 Horizontal-Sliding Doors. Horizontal-sliding doors shall be permitted in means of egress, provided that the following criteria are met:

- (1) The door is readily operable from either side without special knowledge or effort.
- (2) The force that, when applied to the operating device in the direction of egress, is required to operate the door is not more than 15 lbf (67 N).
- (3) The force required to operate the door in the direction of door travel is not more than 30 lbf (133 N) to set the door in motion and is not more than 15 lbf (67 N) to close the door or open it to the minimum required width.
- (4) The door is operable using a force of not more than 50 lbf (222 N) when a force of 250 lbf (1100 N) is applied perpendicularly to the door adjacent to the operating device, unless the door is an existing horizontal-sliding exit access door serving an area with an occupant load of fewer than 50.
- (5) The door assembly complies with the fire protection rating, if required, and, where rated, is self-closing or automatic-closing by means of smoke detection in accordance with 7.2.1.8 and is installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*.

7.2.2 Stairs.

7.2.2.1 General.

7.2.2.1.1 Stairs used as a component in the means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.2, unless otherwise specified in 7.2.2.1.2.

7.2.2.1.2 The requirement of 7.2.2.1.1 shall not apply to the following:

- (1) Aisle stairs in assembly occupancies as provided in Chapter 12 and Chapter 13
- (2) Approved, existing noncomplying stairs

7.2.2.2 Dimensional Criteria.

7.2.2.2.1 Standard Stairs.

7.2.2.2.1.1 Stairs shall meet the following criteria:

- (1) New stairs shall be in accordance with Table 7.2.2.2.1.1(a) and 7.2.2.2.1.2.
- (2)* Existing stairs shall be permitted to remain in use, provided that they meet the requirements for existing stairs shown in Table 7.2.2.2.1.1(b).
- (3) Approved existing stairs shall be permitted to be rebuilt in accordance with the following:
 - (a) Dimensional criteria of Table 7.2.2.2.1.1(b)
 - (b) Other stair requirements of 7.2.2
- (4) The requirements for new and existing stairs shall not apply to stairs located in industrial equipment access areas where otherwise provided in 40.2.5.2.

Feature	Dimensional Criteria	
	ft/in.	mm
Minimum width	See 7.2.2.2.1.2.	
Maximum height of risers	7 in.	180
Minimum height of risers	4 in.	100
Minimum tread depth	11 in.	280
Minimum headroom	6 ft 8 in.	2030
Maximum height between landings	12 ft	3660
Landing	See 7.2.1.3, 7.2.1.4.4, and 7.2.2.3.2.	

Feature	Dimensional Criteria	
	ft/in.	mm

Table 7.2.2.2.1.1(b) Existing Stairs

Feature	Dimensional Criteria	
	ft/in.	mm
Minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side	36 in.	915
Maximum height of risers	8 in.	205
Minimum tread depth	9 in.	230
Minimum headroom	6 ft 8 in.	2030
Maximum height between landings	12 ft	3660
Landing	See 7.2.1.3 and 7.2.1.4.4.	

7.2.2.2.1.2 Minimum New Stair Width.

(A) Where the total occupant load of all stories served by the stair is fewer than 50, the minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side, shall be 36 in. (915 mm).

(B)* Where stairs serve occupant loads exceeding that permitted by 7.2.2.2.1.2(A), the minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side, shall be in accordance with Table 7.2.2.2.1.2(B) and the requirements of 7.2.2.2.1.2(C), (D), and (E).

Table 7.2.2.2.1.2(B) New Stair Width

Total Cumulative Occupant Load Assigned to the Stair	Width
<2000 persons	44 in. (1120 mm)
≥2000 persons	56 in. (1420 mm)

(C) The total cumulative occupant load assigned to a particular stair shall be that stair’s prorated share of the total occupant load, as stipulated in 7.2.2.2.1.2(D) and (E), calculated in proportion to the stair width.

(D) For downward egress travel, stair width shall be based on the total number of occupants from stories above the level where the width is measured.

(E) For upward egress travel, stair width shall be based on the total number of occupants from stories below the level where the width is measured.

(F) The clear width of door openings discharging from stairways required to comply with 7.2.2.2.1.2(B) shall be in accordance with 7.2.1.2.4(9).

7.2.2.2.2 Curved Stairs.

7.2.2.2.2.1 New curved stairs shall be permitted as a component in a means of egress, provided that the depth of tread is not less than 11 in. (280 mm) at a point 12 in. (305 mm) from the narrower end of the tread and the smallest radius is not less than twice the stair width.

7.2.2.2.2.2 Existing curved stairs shall be permitted as a component in a means of egress, provided that the depth of tread is not less than 10 in. (255 mm) at a point 12 in. (305 mm) from the narrower end of the tread and the smallest radius is not less than twice the stair width.

7.2.2.2.3 Spiral Stairs.

7.2.2.2.3.1 Where specifically permitted for individual occupancies by Chapter 12 through Chapter 42, spiral stairs shall be permitted as a component in a means of egress in accordance with 7.2.2.2.3.2 through 7.2.2.2.3.4.

7.2.2.2.3.2 Spiral stairs shall be permitted, provided that the following criteria are met:

- (1) Riser heights shall not exceed 7 in. (180 mm).
- (2) The stairway shall have a tread depth of not less than 11 in. (280 mm) for a portion of the stairway width sufficient to provide egress capacity for the occupant load served in accordance with 7.3.3.1.
- (3) At the outer side of the stairway, an additional 10½ in. (265 mm) of width shall be provided clear to the other handrail, and this width shall not be included as part of the required egress capacity.
- (4) Handrails complying with 7.2.2.4 shall be provided on both sides of the spiral stairway.
- (5) The inner handrail shall be located within 24 in. (610 mm), measured horizontally, of the point where a tread depth of not less than 11 in. (280 mm) is provided.
- (6) The turn of the stairway shall be such that the outer handrail is at the right side of descending users.

7.2.2.2.3.3 Where the occupant load served does not exceed three, spiral stairs shall be permitted, provided that the following criteria are met:

- (1) The clear width of the stairs shall be not less than 26 in. (660 mm).
- (2) The height of risers shall not exceed 9½ in. (240 mm).
- (3) The headroom shall be not less than 6 ft 6 in. (1980 mm).
- (4) Treads shall have a depth not less than 7½ in. (190 mm) at a point 12 in. (305 mm) from the narrower edge.
- (5) All treads shall be identical.
- (6) Handrails shall be provided on both sides of the stairway.

7.2.2.2.3.4 Where the occupant load served does not exceed five, existing spiral stairs shall be permitted, provided that the requirements of 7.2.2.2.3.3(1) through 7.2.2.2.3.3(5) are met.

7.2.2.2.4* Winders.

7.2.2.2.4.1 Where specified in Chapter 12 through Chapter 42, winders shall be permitted in stairs, provided that they meet the requirements of 7.2.2.2.4.2 and 7.2.2.2.4.3.

7.2.2.2.4.2 New winders shall have a tread depth of not less than 6 in. (150 mm) and a tread depth of not less than 11 in. (280 mm) at a point 12 in. (305 mm) from the narrowest edge.

7.2.2.2.4.3 Existing winders shall be permitted to be continued in use, provided that they have

a tread depth of not less than 6 in. (150 mm) and a tread depth of not less than 9 in. (230 mm) at a point 12 in. (305 mm) from the narrowest edge.

7.2.2.3 Stair Details.

7.2.2.3.1 Construction.

7.2.2.3.1.1 All stairs serving as required means of egress shall be of permanent fixed construction, unless they are stairs serving seating that is designed to be repositioned in accordance with Chapter 12 and Chapter 13.

7.2.2.3.1.2 Each stair, platform, and landing, not including handrails and existing stairs, in buildings required in this *Code* to be of Type I or Type II construction shall be of noncombustible material throughout.

7.2.2.3.2 Landings.

7.2.2.3.2.1 Stairs shall have landings at door openings, except as permitted in 7.2.2.3.2.5.

7.2.2.3.2.2 Stairs and intermediate landings shall continue with no decrease in width along the direction of egress travel.

7.2.2.3.2.3 In new buildings, every landing shall have a dimension, measured in the direction of travel, that is not less than the width of the stair.

7.2.2.3.2.4 Landings shall not be required to exceed 48 in. (1220 mm) in the direction of travel, provided that the stair has a straight run.

7.2.2.3.2.5 In one- and two-family dwellings and existing buildings, a door at the top of a stair shall be permitted to open directly to the stair, provided that the door does not swing over the stair and the door serves an area with an occupant load of fewer than 50 persons.

7.2.2.3.3 Tread and Landing Surfaces.

7.2.2.3.3.1 Stair treads and landings shall be solid, without perforations, unless otherwise permitted in 7.2.2.3.3.4.

7.2.2.3.3.2* Stair treads and landings shall be free of projections or lips that could trip stair users.

7.2.2.3.3.3 If not vertical, risers on other than existing stairs shall be permitted to slope under the tread at an angle not to exceed 30 degrees from vertical, provided that the projection of the nosing does not exceed 1½ in. (38 mm).

7.2.2.3.3.4 The requirement of 7.2.2.3.3.1 shall not apply to noncombustible grated stair treads and landings in the following occupancies:

- (1) Assembly occupancies as otherwise provided in Chapter 12 and Chapter 13
- (2) Detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23

(3) Industrial occupancies as otherwise provided in Chapter 40

7.2.2.3.4* Tread and Landing Slope. The tread and landing slope shall not exceed ¼ in./ft (21 mm/m) (a slope of 1 in 48).

7.2.2.3.5* Riser Height and Tread Depth. Riser height shall be measured as the vertical distance between tread nosings. Tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge but shall not include beveled or rounded tread surfaces that slope more than 20 degrees (a slope of 1 in 2.75). At tread nosings, such beveling or rounding shall not exceed ½ in. (13 mm) in horizontal dimension.

7.2.2.3.6 Dimensional Uniformity.

7.2.2.3.6.1 Variation in excess of $\frac{3}{16}$ in. (4.8 mm) in the depth of adjacent treads or in the height of adjacent risers shall be prohibited, unless otherwise permitted in 7.2.2.3.6.3.

7.2.2.3.6.2 The tolerance between the largest and smallest riser or between the largest and smallest tread shall not exceed $\frac{3}{8}$ in. (9.5 mm) in any flight.

7.2.2.3.6.3 Where the bottom riser adjoins a sloping public way, walk, or driveway having an established grade and serving as a landing, the bottom riser shall be permitted to have a variation in height of not more than 1 in. in every 12 in. (25 mm in every 300 mm) of stairway width.

7.2.2.4 Guards and Handrails.

7.2.2.4.1 Handrails.

7.2.2.4.1.1 Stairs and ramps shall have handrails on both sides, unless otherwise permitted in 7.2.2.4.1.5 or 7.2.2.4.1.6.

7.2.2.4.1.2 In addition to the handrails required at the sides of stairs by 7.2.2.4.1.1, the following provisions shall apply:

- (1) For new stairs exceeding 6 ft 3 in. (1905 mm) in width, handrails shall be provided within 30 in. (760 mm) of all portions of the required egress width.
- (2) For existing stairs, handrails shall be provided within 44 in. (1120 mm) of all portions of the required egress width.

7.2.2.4.1.3 Where new intermediate handrails are provided in accordance with 7.2.2.4.1.2, the minimum clear width between handrails shall be 20 in. (510 mm).

7.2.2.4.1.4* The required egress width shall be provided along the natural path of travel.

7.2.2.4.1.5 If a single step or a ramp is part of a curb that separates a sidewalk from a vehicular way, it shall not be required to have a handrail.

7.2.2.4.1.6 Existing stairs, existing ramps, stairs within dwelling units and within guest rooms,

and ramps within dwelling units and guest rooms shall be permitted to have a handrail on one side only.

7.2.2.4.2 Continuity. Required guards and handrails shall continue for the full length of each flight of stairs. At turns of new stairs, inside handrails shall be continuous between flights at landings.

7.2.2.4.3 Projections. The design of guards and handrails and the hardware for attaching handrails to guards, balusters, or walls shall be such that there are no projections that might engage loose clothing. Openings in guards shall be designed to prevent loose clothing from becoming wedged in such openings.

7.2.2.4.4* Handrail Details.

7.2.2.4.4.1 New handrails on stairs shall be not less than 34 in. (865 mm), and not more than 38 in. (965 mm), above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

7.2.2.4.4.2 Existing required handrails shall be not less than 30 in. (760 mm), and not more than 38 in. (965 mm), above the surface of the tread, measured vertically to the top of the rail from the leading edge of the tread.

7.2.2.4.4.3 The height of required handrails that form part of a guard shall be permitted to exceed 38 in. (965 mm), but shall not exceed 42 in. (1065 mm), measured vertically to the top of the rail from the leading edge of the tread.

7.2.2.4.4.4* Additional handrails that are lower or higher than the main handrail shall be permitted.

7.2.2.4.4.5 New handrails shall be installed to provide a clearance of not less than 2¼ in. (57 mm) between the handrail and the wall to which it is fastened.

7.2.2.4.4.6 Handrails shall include one of the following features:

- (1) Circular cross section with an outside diameter of not less than 1¼ in. (32 mm) and not more than 2 in. (51 mm)
- (2)* Shape that is other than circular with a perimeter dimension of not less than 4 in. (100 mm), but not more than 6¼ in. (160 mm), and with the largest cross-sectional dimension not more than 2¼ in. (57 mm), provided that graspable edges are rounded so as to provide a radius of not less than ⅛ in. (3.2 mm)

7.2.2.4.4.7 New handrails shall be continuously graspable along their entire length.

7.2.2.4.4.8 Handrail brackets or balusters attached to the bottom surface of the handrail shall not be considered to be obstructions to graspability, provided that the following criteria are met:

- (1) They do not project horizontally beyond the sides of the handrail within 1½ in. (38 mm) of the bottom of the handrail and provided that, for each additional ½ in. (13 mm) of

handrail perimeter dimension greater than 4 in. (100 mm), the vertical clearance dimension of 1½ in. (38 mm) is reduced by ¼ in. (3.2 mm).

- (2) They have edges with a radius of not less than 0.01 in. (0.25 mm).

7.2.2.4.4.9 New handrail ends shall be returned to the wall or floor or shall terminate at newel posts.

7.2.2.4.4.10 In other than dwelling units, new handrails that are not continuous between flights shall extend horizontally, at the required height, not less than 12 in. (305 mm) beyond the top riser and continue to slope for a depth of one tread beyond the bottom riser.

7.2.2.4.4.11 Within dwelling units, handrails shall extend, at the required height, to at least those points that are directly above the top and bottom risers.

7.2.2.4.5 Guard Details.

7.2.2.4.5.1 The height of guards required in 7.1.8 shall be measured vertically to the top of the guard from the surface adjacent thereto.

7.2.2.4.5.2 Guards shall be not less than 42 in. (1065 mm) high, except as permitted by one of the following:

- (1) Existing guards within dwelling units shall be permitted to be not less than 36 in. (915 mm) high.
- (2) The requirement of 7.2.2.4.5.2 shall not apply in assembly occupancies where otherwise provided in Chapter 12 and Chapter 13.
- (3)* Existing guards on existing stairs shall be permitted to be not less than 30 in. (760 mm) high.

7.2.2.4.5.3* Open guards, other than approved, existing open guards, shall have intermediate rails or an ornamental pattern such that a sphere 4 in. (100 mm) in diameter is not able to pass through any opening up to a height of 34 in. (865 mm), and the following also shall apply:

- (1) The triangular openings formed by the riser, tread, and bottom element of a guardrail at the open side of a stair shall be of such size that a sphere 6 in. (150 mm) in diameter is not able to pass through the triangular opening.
- (2) In detention and correctional occupancies, in industrial occupancies, and in storage occupancies, the clear distance between intermediate rails, measured at right angles to the rails, shall not exceed 21 in. (535 mm).

7.2.2.5 Enclosure and Protection of Stairs.

7.2.2.5.1 Enclosures.

7.2.2.5.1.1 All inside stairs serving as an exit or exit component shall be enclosed in accordance with 7.1.3.2.

7.2.2.5.1.2 Inside stairs, other than those serving as an exit or exit component, shall be protected in accordance with Section 8.6.

7.2.2.5.1.3 In existing buildings, where a two-story exit enclosure connects the story of exit discharge with an adjacent story, the exit shall be permitted to be enclosed only on the story of exit discharge, provided that not less than 50 percent of the number and capacity of exits on the story of exit discharge are independent of such enclosures.

7.2.2.5.2* Exposures.

7.2.2.5.2.1 Where nonrated walls or unprotected openings enclose the exterior of a stairway, other than an existing stairway, and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees, the building enclosure walls within 10 ft (3050 mm) horizontally of the nonrated wall or unprotected opening shall be constructed as required for stairway enclosures, including opening protectives.

7.2.2.5.2.2 Construction shall extend vertically from the ground to a point 10 ft (3050 mm) above the topmost landing of the stairs or to the roofline, whichever is lower.

7.2.2.5.2.3 The fire resistance rating of the separation extending 10 ft (3050 mm) from the stairs shall not be required to exceed 1 hour where openings have not less than a ¾-hour fire protection rating.

7.2.2.5.3* Usable Space. Enclosed, usable spaces within exit enclosures shall be prohibited, including under stairs, unless otherwise permitted by 7.2.2.5.3.2.

7.2.2.5.3.1 Open space within the exit enclosure shall not be used for any purpose that has the potential to interfere with egress.

7.2.2.5.3.2 Enclosed, usable space shall be permitted under stairs, provided that the following criteria are met:

- (1) The space shall be separated from the stair enclosure by the same fire resistance as the exit enclosure.
- (2) Entrance to the enclosed, usable space shall not be from within the stair enclosure. (*See also 7.1.3.2.3.*)

7.2.2.5.4* Stairway Marking.

7.2.2.5.4.1 Enclosed stairs meeting either of the following two conditions shall comply with 7.2.2.5.4.1(A) through 7.2.2.5.4.1(H):

- (1) The stair is a new enclosed stair serving three or more stories.
- (2) The stair is an existing enclosed stair serving five or more stories.

(A) The stairs shall be provided with special signage within the enclosure at each floor landing.

- (B) The signage shall indicate the floor level.
- (C) The signage shall indicate the terminus of the top and bottom of the stair enclosure.
- (D) The signage shall indicate the identification of the stair enclosure.
- (E) The signage shall indicate the floor level of, and the direction to, exit discharge.
- (F) The signage shall be located inside the enclosure approximately 60 in. (1525 mm) above the floor landing in a position that is visible when the door is in the open or closed position.
- (G) The signage shall comply with 7.10.8.1 and 7.10.8.2 of this *Code*.
- (H) The floor level designation shall also be tactile in accordance with ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

7.2.2.5.4.2 Wherever an enclosed stair requires travel in an upward direction to reach the level of exit discharge, special signs with directional indicators showing the direction to the level of exit discharge shall be provided at each floor level landing from which upward direction of travel is required, unless otherwise provided in 7.2.2.5.4.2(A) and 7.2.2.5.4.2(B), and the following also shall apply:

- (1) Such signage shall comply with 7.10.8.1 and 7.10.8.2.
 - (2) Such signage shall be visible when the door is in the open or closed position.
- (A) The requirement of 7.2.2.5.4.2 shall not apply where signs required by 7.2.2.5.4.1 are provided.
- (B) The requirement of 7.2.2.5.4.2 shall not apply to stairs extending not more than one story below the level of exit discharge where the exit discharge is clearly obvious.

7.2.2.5.4.3 The sign shall be painted or stenciled on the wall or on a separate sign securely attached to the wall.

7.2.2.5.4.4 The stairway identification letter shall be located at the top of the sign in minimum 1 in. (25 mm) high lettering and shall be in accordance with 7.10.8.2.

7.2.2.5.4.5 Roof access or the lack thereof shall be designated by a sign that reads ROOF ACCESS or NO ROOF ACCESS and located under the stairway identification letter. Lettering shall be a minimum of 1 in. (25 mm) high and shall be in accordance with 7.10.8.2.

7.2.2.5.4.6 The floor level number shall be located in the middle of the sign in minimum 5 in. (125 mm) high numbers and shall be in accordance with 7.10.8.2. Mezzanine levels shall have the letter “M” or other appropriate identification letter preceding the floor number, while basement levels shall have the letter “B” or other appropriate identification letter preceding the floor level number.

7.2.2.5.4.7 Identification of the lower and upper terminus of the stairway shall be located at the bottom of the sign in minimum 1 in. (25 mm) high letters or numbers and shall be in

accordance with 7.10.8.2.

7.2.2.5.4.8* Where new contrasting marking is applied to stairs, such marking shall comply with the following:

- (1) The marking shall include a continuous strip as a coating on, or as a material integral with, the full width of the leading edge of each tread.
- (2) The marking shall include a continuous strip as a coating on, or as a material integral with, the full width of the leading edge of each landing nosing.
- (3) The marking strip width, measured horizontally from the leading vertical edge of the nosing, shall be consistent at all nosings.
- (4) The marking strip width shall be 1 in. to 2 in. (25 mm to 51 mm).

7.2.2.6 Special Provisions for Outside Stairs.

7.2.2.6.1 Access. Where approved by the authority having jurisdiction, outside stairs shall be permitted to lead to roofs of other sections of a building or an adjoining building where the construction is fire resistive and there is a continuous and safe means of egress from the roof. *(See also 7.7.6.)*

7.2.2.6.2* Visual Protection. Outside stairs shall be arranged to avoid any impediments to the use of the stairs by persons having a fear of high places. Outside stairs more than three stories in height, other than previously approved existing stairs, shall be provided with an opaque visual obstruction not less than 48. in. (1220 mm) in height.

7.2.2.6.3 Separation and Protection of Outside Stairs.

7.2.2.6.3.1 Outside stairs shall be separated from the interior of the building by construction with the fire resistance rating required for enclosed stairs with fixed or self-closing opening protectives, except as follows:

- (1) Outside stairs serving an exterior exit access balcony that has two remote outside stairways or ramps shall be permitted to be unprotected.
- (2) Outside stairs serving not in excess of two adjacent stories, including the story of exit discharge, shall be permitted to be unprotected where there is a remotely located second exit.
- (3) In existing buildings, existing outside stairs serving not in excess of three adjacent stories, including the story of exit discharge, shall be permitted to be unprotected where there is a remotely located second exit.
- (4) The fire resistance rating of a separation extending 10 ft (3050 mm) from the stairs shall not be required to exceed 1 hour where openings have not less than a ¾-hour fire protection rating.
- (5) Outside stairs in existing buildings protected throughout by an approved, supervised

automatic sprinkler system in accordance with Section 9.7 shall be permitted to be unprotected.

7.2.2.6.3.2 Wall construction required by 7.2.2.6.3.1 shall extend as follows:

- (1) Vertically from the ground to a point 10 ft (3050 mm) above the topmost landing of the stairs or to the roofline, whichever is lower
- (2) Horizontally for not less than 10 ft (3050 mm)

7.2.2.6.3.3 Roof construction required by 7.2.2.6.3.1 shall meet the following criteria:

- (1) It shall provide protection beneath the stairs.
- (2) It shall extend horizontally to each side of the stair for not less than 10 ft (3050 mm).

7.2.2.6.4 Protection of Openings. All openings below an outside stair shall be protected with an assembly having not less than a ¾-hour fire protection rating as follows:

- (1) Where located in a court, the smallest dimension of which does not exceed one-third its height
- (2) Where located in an alcove having a width that does not exceed one-third its height and a depth that does not exceed one-fourth its height

7.2.2.6.5* Water Accumulation. Outside stairs and landings, other than existing outside stairs and landings, shall be designed to minimize water accumulation on their surfaces.

7.2.2.6.6 Openness. Outside stairs, other than existing outside stairs, shall be not less than 50 percent open on one side. Outside stairs shall be arranged to restrict the accumulation of smoke.

7.2.3 Smokeproof Enclosures.

7.2.3.1 General. Where smokeproof enclosures are required in other sections of this *Code*, they shall comply with 7.2.3, unless they are approved, existing smokeproof enclosures.

7.2.3.2 Performance Design. An appropriate design method shall be used to provide a system that meets the definition of *smokeproof enclosure* (see 3.3.226). The smokeproof enclosure shall be permitted to be created by using natural ventilation, by using mechanical ventilation incorporating a vestibule, or by pressurizing the stair enclosure.

7.2.3.3 Enclosure. A smokeproof enclosure shall be enclosed from the highest point to the lowest point by barriers having 2-hour fire resistance ratings. Where a vestibule is used, it shall be within the 2-hour-rated enclosure and shall be considered part of the smokeproof enclosure.

7.2.3.4 Vestibule. Where a vestibule is provided, the doorway into the vestibule shall be protected with an approved fire door assembly having a 1½-hour fire protection rating, and the fire door assembly from the vestibule to the smokeproof enclosure shall have not less than a 20-minute fire protection rating. Doors shall be designed to minimize air leakage and shall be self-closing or shall be automatic-closing by actuation of a smoke detector within 10 ft (3050

mm) of the vestibule door. New doors shall be installed in accordance with NFPA 105, *Standard for the Installation of Smoke Door Assemblies*.

7.2.3.5 Discharge. Every smokeproof enclosure shall discharge into a public way, into a yard or court having direct access to a public way, or into an exit passageway. Such exit passageways shall be without openings, other than the entrance to the smokeproof enclosure and the door to the outside yard, court, or public way. The exit passageway shall be separated from the remainder of the building by a 2-hour fire resistance rating.

7.2.3.6 Access. For smokeproof enclosures other than those consisting of a pressurized stair enclosure complying with 7.2.3.9, access to the smokeproof enclosure stair shall be by way of a vestibule or by way of an exterior balcony.

7.2.3.7 Natural Ventilation. Smokeproof enclosures using natural ventilation shall comply with 7.2.3.3 and the following:

- (1) Where access to the stair is by means of an open exterior balcony, the door assembly to the stair shall have a 1½-hour fire protection rating and shall be self-closing or shall be automatic-closing by actuation of a smoke detector.
- (2) Openings adjacent to the exterior balcony specified in 7.2.3.7(1) shall be protected in accordance with 7.2.2.6.4.
- (3) Every vestibule shall have a net area of not less than 16 ft² (1.5 m²) of opening in an exterior wall facing an exterior court, yard, or public space not less than 20 ft (6100 mm) in width.
- (4) Every vestibule shall have a minimum dimension of not less than the required width of the corridor leading to it and a dimension of not less than 6 ft (1830 mm) in the direction of travel.

7.2.3.8 Mechanical Ventilation. Smokeproof enclosures using mechanical ventilation shall comply with 7.2.3.3 and the requirements of 7.2.3.8.1 through 7.2.3.8.4.

7.2.3.8.1 Vestibules shall have a dimension of not less than 44 in. (1120 mm) in width and not less than 6 ft (1830 mm) in direction of travel.

7.2.3.8.2 The vestibule shall be provided with not less than one air change per minute, and the exhaust shall be 150 percent of the supply. Supply air shall enter and exhaust air shall discharge from the vestibule through separate tightly constructed ducts used only for such purposes. Supply air shall enter the vestibule within 6 in. (150 mm) of the floor level. The top of the exhaust register shall be located not more than 6 in. (150 mm) below the top of the trap and shall be entirely within the smoke trap area. Doors, when in the open position, shall not obstruct duct openings. Controlling dampers shall be permitted in duct openings if needed to meet the design requirements.

7.2.3.8.3 To serve as a smoke and heat trap and to provide an upward-moving air column, the vestibule ceiling shall be not less than 20 in. (510 mm) higher than the door opening into the

vestibule. The height shall be permitted to be decreased where justified by engineering design and field testing.

7.2.3.8.4 The stair shall be provided with a dampered relief opening at the top and supplied mechanically with sufficient air to discharge at least 2500 ft³/min (70.8 m³/min) through the relief opening while maintaining a positive pressure of not less than 0.10 in. water column (25 N/m²) in the stair, relative to the vestibule with all doors closed.

7.2.3.9 Stair Pressurization.

7.2.3.9.1* Smokeproof enclosures using stair pressurization shall use an approved engineered system with a design pressure difference across the barrier of not less than 0.05 in. water column (12.5 N/m²) in sprinklered buildings, or 0.10 in. water column (25 N/m²) in nonsprinklered buildings, and shall be capable of maintaining these pressure differences under likely conditions of stack effect or wind. The pressure difference across doors shall not exceed that which allows the door to begin to be opened by a force of 30 lbf (133 N) in accordance with 7.2.1.4.5.

7.2.3.9.2 Equipment and ductwork for stair pressurization shall be located in accordance with one of the following specifications:

- (1) Exterior to the building and directly connected to the stairway by ductwork enclosed in noncombustible construction
- (2) Within the stair enclosure with intake and exhaust air vented directly to the outside or through ductwork enclosed by a 2-hour fire-resistive rating
- (3) Within the building under the following conditions:
 - (a) Where the equipment and ductwork are separated from the remainder of the building, including other mechanical equipment, by a 2-hour fire-resistive rating
 - (b) Where the building, including the stairway enclosure, is protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7, and the equipment and ductwork are separated from the remainder of the building, including other mechanical equipment, by not less than a 1-hour fire-resistive rating

7.2.3.9.3 In all cases specified by 7.2.3.9.2(1) through 7.2.3.9.2(3), openings into the required fire resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by self-closing fire protection-rated devices in accordance with 8.3.4.

7.2.3.10 Activation of Mechanical Ventilation and Pressurized Stair Systems.

7.2.3.10.1 For both mechanical ventilation and pressurized stair enclosure systems, the activation of the systems shall be initiated by a smoke detector installed in an approved location within 10 ft (3050 mm) of the entrance to the smokeproof enclosure.

7.2.3.10.2 The required mechanical system shall operate upon the activation of the smoke detectors specified in 7.2.3.10.1 and by manual controls accessible to the fire department. The required system also shall be initiated by the following, if provided:

- (1) Waterflow signal from a complete automatic sprinkler system
- (2) General evacuation alarm signal (*see 9.6.3.6*)

7.2.3.11 Door Closers. The activation of an automatic-closing device on any door in the smokeproof enclosure shall activate all other automatic-closing devices on doors in the smokeproof enclosure.

7.2.3.12 Emergency Power Supply System (EPSS). Power shall be provided as follows:

- (1) A Type 60, Class 2, Level 2, EPSS for new mechanical ventilation equipment shall be provided in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*.
- (2) A previously approved existing standby power generator installation with a fuel supply adequate to operate the equipment for 2 hours shall be permitted in lieu of 7.2.3.12(1).
- (3) The generator shall be located in a room having a minimum 1-hour fire resistance-rated separation from the remainder of the building.

7.2.3.13 Testing. Before the mechanical equipment is accepted by the authority having jurisdiction, it shall be tested to confirm that it is operating in compliance with the requirements of 7.2.3. All operating parts of the system shall be tested semiannually by approved personnel, and a log shall be kept of the results.

7.2.4 Horizontal Exits.

7.2.4.1 General.

7.2.4.1.1 Where horizontal exits are used in the means of egress, they shall conform to the general requirements of Section 7.1 and the special requirements of 7.2.4.

7.2.4.1.2* Horizontal exits shall be permitted to be substituted for other exits where the total egress capacity of the other exits (stairs, ramps, doors leading outside the building) is not less than half that required for the entire area of the building or connected buildings, and provided that none of the other exits is a horizontal exit, unless otherwise permitted by 7.2.4.1.3.

7.2.4.1.3 The requirement of 7.2.4.1.2 shall not apply to the following:

- (1) Health care occupancies as otherwise provided in Chapter 18 and Chapter 19
- (2) Detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23

7.2.4.2 Fire Compartments.

7.2.4.2.1 Every fire compartment for which credit is permitted in connection with a horizontal

exit(s) also shall have at least one additional exit, but not less than 50 percent of the required number and capacity of exits, that is not a horizontal exit, unless otherwise provided in 7.2.4.2.1.2.

7.2.4.2.1.1 Any fire compartment not having an exit leading outside shall be considered as part of an adjoining compartment with an exit leading to the outside.

7.2.4.2.1.2 The requirement of 7.2.4.2.1 shall not apply to the following:

- (1) Health care occupancies as otherwise provided in Chapter 18 and Chapter 19
- (2) Detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23

7.2.4.2.2 Every horizontal exit for which credit is permitted shall be arranged so that there are continuously available paths of travel leading from each side of the exit to stairways or other means of egress leading to outside the building.

7.2.4.2.3 Wherever either side of a horizontal exit is occupied, the doors used in connection with the horizontal exit shall be unlocked from the egress side, unless otherwise permitted for the following:

- (1) Health care occupancies as provided in Chapter 18 and Chapter 19
- (2) Detention and correctional occupancies as provided in Chapter 22 and Chapter 23

7.2.4.2.4 The floor area on either side of a horizontal exit shall be sufficient to hold the occupants of both floor areas and shall provide at least 3 ft² (0.28 m²) clear floor area per person, unless otherwise permitted for the following:

- (1) Health care occupancies as provided in Chapter 18 and Chapter 19
- (2) In detention and correctional occupancies as provided in Chapter 22 and Chapter 23

7.2.4.3 Fire Barriers.

7.2.4.3.1 Fire barriers separating building areas between which there are horizontal exits shall have a 2-hour fire resistance rating and shall provide a separation that is continuous to ground. (*See also Section 8.3.*)

7.2.4.3.2 Where a fire barrier provides a horizontal exit in any story of a building, such fire barrier shall not be required on other stories, provided that the following criteria are met:

- (1) The stories on which the fire barrier is omitted are separated from the story with the horizontal exit by construction having a fire resistance rating at least equal to that of the horizontal exit fire barrier.
- (2) Vertical openings between the story with the horizontal exit and the open fire area story are enclosed with construction having a fire resistance rating at least equal to that of the horizontal exit fire barrier.

(3) All required exits, other than horizontal exits, discharge directly to the outside.

7.2.4.3.3 Where fire barriers serving horizontal exits, other than existing horizontal exits, terminate at outside walls, and the outside walls are at an angle of less than 180 degrees for a distance of 10 ft (3050 mm) on each side of the horizontal exit, the outside walls shall have not less than a 1-hour fire resistance rating, with opening protectives of not less than a ¾-hour fire protection rating, for a distance of 10 ft (3050 mm) on each side of the horizontal exit.

7.2.4.3.4 Fire barriers forming horizontal exits shall not be penetrated by ducts, unless one of the following criteria is met:

- (1) The ducts are existing penetrations protected by approved and listed fire dampers.
- (2) The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
- (3) The duct penetrations are those permitted in detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23 and are protected by combination fire dampers/smoke leakage-rated dampers that meet the smoke damper actuation requirements of 8.5.5.

7.2.4.3.5 Any opening in the fire barriers specified in 7.2.4.3.4 shall be protected as provided in 8.3.4.

7.2.4.3.6 Doors in horizontal exits shall comply with 7.2.1.4, unless they are sliding doors in industrial or storage occupancies as otherwise provided in Chapter 40 and Chapter 42.

7.2.4.3.7 Unless otherwise specified in 7.2.4.3.7.1 and 7.2.4.3.7.2, swinging fire doors shall be permitted in horizontal exits, provided that the criteria of both 7.2.4.3.7(1) and 7.2.4.3.7(2), or the criteria of both 7.2.4.3.7(1) and 7.2.4.3.7(3), are met as follows:

- (1) The doors shall swing in the direction of egress travel.
- (2) In other than sleeping room areas in detention and correctional occupancies, where a horizontal exit serves areas on both sides of a fire barrier, adjacent openings with swinging doors that open in opposite directions shall be provided, with signs on each side of the fire barrier identifying the door that swings with the travel from that side.
- (3) The doors shall be of any other approved arrangement, provided that the doors always swing with any possible egress travel.

7.2.4.3.7.1 The requirements of 7.2.4.3.7 shall not apply to horizontal exit door swing as provided in Chapter 19 and Chapter 23.

7.2.4.3.7.2 The requirements of 7.2.4.3.7 shall not apply to horizontal exit doors in corridors not more than 6 ft (1830 mm) wide in existing buildings.

7.2.4.3.8 Doors in horizontal exits shall be designed and installed to minimize air leakage. New doors in horizontal exits shall be installed in accordance with NFPA 105, *Standard for the*

Installation of Smoke Door Assemblies.

7.2.4.3.9* All fire doors in horizontal exits shall be self-closing or automatic-closing in accordance with 7.2.1.8.

7.2.4.3.10 Horizontal exit doors located across a corridor, other than approved existing doors, shall be automatic-closing in accordance with 7.2.1.8.2.

7.2.4.4 Bridges and Balconies.

7.2.4.4.1 Each bridge or balcony used in conjunction with horizontal exits shall have guards and handrails in conformity with the requirements of 7.2.2.4.

7.2.4.4.2 Every bridge or balcony shall be not less than the width of the door to which it leads and shall be not less than 44 in. (1120 mm) wide for new construction.

7.2.4.4.3 Where the bridge or balcony serves as a horizontal exit in one direction, the horizontal exit door shall be required to swing only in the direction of egress travel, unless the door complies with the swing requirements for the following:

- (1) Existing health care occupancies in Chapter 19
- (2) Existing detention and correctional occupancies in Chapter 23

7.2.4.4.4 Where the bridge or balcony serves as a horizontal exit in both directions, doors shall be provided in pairs that swing in opposite directions, with only the door swinging in the direction of egress travel included when determining egress capacity, unless otherwise provided in 7.2.4.4.4.1 through 7.2.4.4.4.3.

7.2.4.4.4.1 Approved existing doors on both ends of the bridge or balcony shall be permitted to swing out from the building.

7.2.4.4.4.2 The requirement of 7.2.4.4.4 shall not apply if the bridge or balcony has sufficient floor area to accommodate the occupant load of either connected building or fire area based on 3 ft² (0.28 m²) per person.

7.2.4.4.4.3 The requirement of 7.2.4.4.4 shall not apply to horizontal exit door swing as provided for the following:

- (1) Existing health care occupancies in Chapter 19
- (2) Existing detention and correctional occupancies in Chapter 23

7.2.4.4.5 In climates subject to the accumulation of snow and ice, the bridge or balcony floor shall be protected to prevent the accumulation of snow and ice.

7.2.4.4.6 In existing buildings, one step not exceeding 8 in. (205 mm) shall be permitted below the level of the inside floor.

7.2.4.4.7 In both of the connected buildings or fire areas, any part of any wall opening that is within 10 ft (3050 mm) of any bridge or balcony, as measured horizontally or below, shall be

protected with fire door assemblies or fixed fire window assemblies having a ¾-hour fire protection rating, unless otherwise provided in 7.2.4.4.8.

7.2.4.4.8 The requirement of 7.2.4.4.7 shall not apply to approved existing bridges and balconies.

7.2.5 Ramps.

7.2.5.1 General. Every ramp used as a component in a means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.5.

7.2.5.2 Dimensional Criteria. The following dimensional criteria shall apply to ramps:

- (1) New ramps shall be in accordance with Table 7.2.5.2(a), unless otherwise permitted by the following:
 - (a) Table 7.2.5.2(a) shall not apply to industrial equipment access areas as provided in 40.2.5.2
 - (b) The maximum slope requirement shall not apply to ramps in assembly occupancies as provided in Chapter 12.
 - (c) The maximum slope or maximum rise for a single ramp run shall not apply to ramps providing access to vehicles, vessels, mobile structures, and aircraft.
- (2) Existing ramps shall be permitted to remain in use or be rebuilt, provided that they meet the requirements shown in Table 7.2.5.2(b), unless otherwise permitted by the following:
 - (a) The requirements of Table 7.2.5.2(b) shall not apply to industrial equipment access areas as provided in 40.2.5.2.
 - (b) The maximum slope or maximum height between landings for a single ramp run shall not apply to ramps providing access to vehicles, vessels, mobile structures, and aircraft.
 - (c) Approved existing ramps with slopes not steeper than 1 in 6 shall be permitted to remain in use.
 - (d) Existing ramps with slopes not steeper than 1 in 10 shall not be required to be provided with landings.

Table 7.2.5.2(a) New Ramps

Feature	Dimensional Criteria	
	in.	mm

Table 7.2.5.2(a) New Ramps

Feature	Dimensional Criteria	
	in.	mm
Minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side	44 in.	1120
Maximum slope	1 in 12	
Maximum cross slope	1 in 48	
Maximum rise for a single ramp run	30 in.	760

Table 7.2.5.2(b) Existing Ramps

Feature	Dimensional Criteria	
	ft/in.	mm
Minimum width	30 in.	760
Maximum slope	1 in 8	
Maximum height between landings	12 ft	3660

7.2.5.3 Ramp Details.

7.2.5.3.1 Construction. Ramp construction shall be as follows:

- (1) All ramps serving as required means of egress shall be of permanent fixed construction.
- (2) Each ramp in buildings required by this *Code* to be of Type I or Type II construction shall be any combination of noncombustible or limited-combustible material or fire-retardant-treated wood.
- (3) Ramps constructed with fire-retardant-treated wood shall be not more than 30 in. (760 mm) high, shall have an area of not more than 3000 ft² (277 m²), and shall not occupy more than 50 percent of the room area.
- (4) The ramp floor and landings shall be solid and without perforations.

7.2.5.3.2 Landings. Ramp landings shall be as follows:

- (1) Ramps shall have landings located at the top, at the bottom, and at doors opening onto the ramp.
- (2) The slope of the landing shall be not steeper than 1 in 48.

- (3) Every landing shall have a width not less than the width of the ramp.
- (4) Every landing, except as otherwise provided in 7.2.5.3.2(5), shall be not less than 60 in. (1525 mm) long in the direction of travel, unless the landing is an approved existing landing.
- (5) Where the ramp is not part of an accessible route, the ramp landings shall not be required to exceed 48 in. (1220 mm) in the direction of travel, provided that the ramp has a straight run.
- (6) Any changes in travel direction shall be made only at landings, unless the ramp is an existing ramp.
- (7) Ramps and intermediate landings shall continue with no decrease in width along the direction of egress travel.

7.2.5.3.3 Drop-Offs. Ramps and landings with drop-offs shall have curbs, walls, railings, or projecting surfaces that prevent people from traveling off the edge of the ramp. Curbs or barriers shall be not less than 4 in. (100 mm) in height.

7.2.5.4 Guards and Handrails.

7.2.5.4.1 Guards complying with 7.2.2.4 shall be provided for ramps, unless otherwise provided in 7.2.5.4.4.

7.2.5.4.2 Handrails complying with 7.2.2.4 shall be provided along both sides of a ramp run with a rise greater than 6 in. (150 mm), unless otherwise provided in 7.2.5.4.4.

7.2.5.4.3 The height of handrails and guards shall be measured vertically to the top of the guard or rail from the walking surface adjacent thereto.

7.2.5.4.4 The requirements of 7.2.5.4.1 and 7.2.5.4.2 shall not apply to guards and handrails provided for ramped aisles in assembly occupancies as otherwise provided in Chapter 12 and Chapter 13.

7.2.5.5 Enclosure and Protection of Ramps. Ramps in a required means of egress shall be enclosed or protected as a stair in accordance with 7.2.2.5 and 7.2.2.6.

7.2.5.6 Special Provisions for Outside Ramps.

7.2.5.6.1* Visual Protection. Outside ramps shall be arranged to avoid any impediments to their use by persons having a fear of high places. For ramps more than three stories in height, any arrangement intended to meet this requirement shall be at least 48 in. (1220 mm) in height.

7.2.5.6.2* Water Accumulation. Outside ramps and landings shall be designed to minimize water accumulation on their surfaces.

7.2.6* Exit Passageways.

7.2.6.1* General. Exit passageways used as exit components shall conform to the general

requirements of Section 7.1 and to the special requirements of 7.2.6.

7.2.6.2 Enclosure. An exit passageway shall be separated from other parts of the building as specified in 7.1.3.2, and the following alternatives shall be permitted:

- (1) Fire windows in accordance with 8.3.3 shall be permitted to be installed in the separation in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
- (2) Existing fixed wired glass panels in steel sash shall be permitted to be continued in use in the separation in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

7.2.6.3 Stair Discharge. An exit passageway that serves as a discharge from a stair enclosure shall have not less than the same fire resistance rating and opening protective fire protection rating as those required for the stair enclosure.

7.2.6.4 Width. The width of an exit passageway shall be adequate to accommodate the aggregate required capacity of all exits that discharge through it, unless one of the following conditions applies:

- (1)* Where an exit passageway serves occupants of the level of exit discharge as well as other stories, the capacity shall not be required to be aggregated.
- (2) As provided in Chapter 36 and Chapter 37, an exit passageway in a mall building shall be permitted to accommodate occupant loads independently from the mall and the tenant spaces. (*See 36.2.2.7.2 and 37.2.2.7.2.*)

7.2.6.5 Floor. The floor shall be solid and without perforations.

7.2.7 Escalators and Moving Walks. Escalators and moving walks shall not constitute a part of the required means of egress, unless they are previously approved existing escalators and moving walks.

7.2.8 Fire Escape Stairs.

7.2.8.1 General.

7.2.8.1.1 Fire escape stairs shall comply with the provisions of 7.2.8, unless they are approved, existing fire escape stairs.

7.2.8.1.2 Fire escape stairs shall not constitute any of the required means of egress, unless otherwise provided in 7.2.8.1.2.1 and 7.2.8.1.2.2.

7.2.8.1.2.1 Fire escape stairs shall be permitted on existing buildings as provided in Chapter 11 through Chapter 42 but shall not constitute more than 50 percent of the required means of egress.

7.2.8.1.2.2 New fire escape stairs shall be permitted to be erected on existing buildings only where the authority having jurisdiction has determined that outside stairs are impractical. (*See*

7.2.2.)

7.2.8.1.2.3 New fire escape stairs permitted by 7.2.8.1.2.2 shall not incorporate ladders or access windows, regardless of occupancy classification or occupant load served.

7.2.8.1.3 Fire escape stairs of the return-platform type with superimposed runs, or of the straight-run type with a platform that continues in the same direction, shall be permitted. Either type shall be permitted to be parallel to, or at right angles to, buildings. Either type shall be permitted to be attached to buildings or erected independently of buildings and connected by walkways.

7.2.8.2 Protection of Openings. Fire escape stairs shall be exposed to the smallest possible number of window and door openings, and each opening shall be protected with approved fire door or fire window assemblies where the opening or any portion of the opening is located as follows:

- (1) Horizontally, within 15 ft (4570 mm) of any balcony, platform, or stairway constituting a component of the fire escape stair
- (2) Below, within three stories or 35 ft (10.7 m) of any balcony, platform, walkway, or stairway constituting a component of the fire escape stair, or within two stories or 20 ft (6100 mm) of a platform or walkway leading from any story to the fire escape stair
- (3) Above, within 10 ft (3050 mm) of any balcony, platform, or walkway, as measured vertically, or within 10 ft (3050 mm) of any stair tread surface, as measured vertically
- (4) Facing a court served by a fire escape stair, where the least dimension of the court does not exceed one-third of the height to the uppermost platform of the fire escape stair, measured from the ground
- (5) Facing an alcove served by a fire escape stair, where the width of the alcove does not exceed one-third, or the depth of the alcove does not exceed one-fourth, of the height to the uppermost platform of the fire escape stair, measured from the ground

7.2.8.2.1 The requirements of 7.2.8.2 shall not apply to openings located on the top story where stairs do not lead to the roof.

7.2.8.2.2 The requirements of 7.2.8.2 shall be permitted to be modified by the authority having jurisdiction where automatic sprinkler protection is provided, where the occupancy is limited to low hazard contents, or where other special conditions exist.

7.2.8.2.3 The requirements of 7.2.8.2 for the protection of window openings shall not apply where such window openings are necessary for access to existing fire escape stairs.

7.2.8.3 Access.

7.2.8.3.1 Access to fire escape stairs shall be in accordance with 7.2.8.4 and 7.5.1.1.1 through 7.5.1.2.2.

7.2.8.3.2 Where access is permitted by way of windows, the windows shall be arranged and

maintained so as to be easily opened. Screening or storm windows that restrict free access to the fire escape stair shall be prohibited.

7.2.8.3.3 Fire escape stairs shall extend to the roof in all cases where the roof is subject to occupancy or provides an area of safe refuge, unless otherwise provided in 7.2.8.3.4.

7.2.8.3.4 Where a roof has a pitch that does not exceed 1 to 6, fire escape ladders in accordance with 7.2.9 or alternating tread devices in accordance with 7.2.11 shall be permitted to provided access to the roof.

7.2.8.3.5 Access to a fire escape stair shall be directly to a balcony, landing, or platform; shall not exceed the floor or windowsill level; and shall not be more than 8 in. (205 mm) below the floor level or 18 in. (455 mm) below the windowsill level.

7.2.8.4 Stair Details.

7.2.8.4.1 General. Fire escape stairs shall comply with the requirements of Table 7.2.8.4.1(a). Replacement of fire escape stairs shall comply with the requirements of Table 7.2.8.4.1(b).

Table 7.2.8.4.1(a) Fire Escape Stairs

Feature	Serving More than 10 Occupants	Serving 10 or Fewer C
Minimum widths	22 in. (560 mm) clear between rails	18 in. (455 mm) clear betwe
Minimum horizontal dimension of any landing or platform	22 in. (560 mm) clear	18 in. (455 mm) clear
Maximum riser height	9 in. (230 mm)	12 in. (305 mm)
Minimum tread, exclusive of nosing	9 in. (230 mm)	6 in. (150 mm)
Minimum nosing or projection	1 in. (25 mm)	No requirement
Tread construction	Solid ½ in. (13 mm) diameter perforations permitted	Flat metal bars on edge or sc secured against turning, spac mm) maximum on centers
Winders	None	Permitted subject to capacity
Risers	None	No requirement
Spiral	None	Permitted subject to capacity
Maximum height between landings	12 ft (3660 mm)	No requirement
Headroom, minimum	6 ft 8 in. (2030 mm)	6 ft 8 in. (2030 mm)
Access to escape	Door or casement windows, 24 in. × 6 ft 8 in. (610 mm × 1980 mm); or double-hung windows, 30 in. × 36 in. (760 mm × 915 mm) clear opening	Windows providing a clear c at least 20 in. (510 mm) in v (610 mm) in height, and 5.7 in area
Level of access opening	Not over 12 in. (305 mm) above floor; steps if higher	Not over 12 in. (305 mm) at steps if higher
Discharge to ground	Swinging stair section permitted if approved by authority having jurisdiction	Swinging stair, or ladder if a authority having jurisdiction

Table 7.2.8.4.1(a) Fire Escape Stairs

Feature	Serving More than 10 Occupants	Serving 10 or Fewer C
Capacity	½ in. (13 mm) per person, if access by door; 1 in. (25 mm) per person, if access by climbing over windowsill	10 persons; if winders or ladder bottom balcony, 5 persons; 1 person

Table 7.2.8.4.1(b) Replacement Fire Escape Stairs

Feature	Serving More than 10 Occupants	Serving 10 or Fewer Occupants
Minimum widths	22 in. (560 mm) clear between rails	22 in. (560 mm) clear between rails
Minimum horizontal dimension of any landing or platform	22 in. (560 mm)	22 in. (560 mm)
Maximum riser height	9 in. (230 mm)	9 in. (230 mm)
Minimum tread, exclusive of nosing	10 in. (255 mm)	10 in. (255 mm)
Tread construction	Solid, ½ in. (13 mm) diameter perforations permitted	Solid, ½ in. (13 mm) diameter perforations permitted
Winders	None	Permitted subject to 7.2.2.2.4
Spiral	None	Permitted subject to 7.2.2.2.3
Risers	None	None
Maximum height between landings	12 ft (3660 mm)	12 ft (3660 mm)
Headroom, minimum	6 ft 8 in. (2030 mm)	6 ft 8 in. (2030 mm)
Access to escape	Door or casement windows, 24 in. × 6 ft 8 in. (610 mm × 1980 mm); or double-hung windows, 30 in. × 36 in. (760 mm × 915 mm) clear opening	Windows providing a clear opening of at least 20 in. (510 mm) in width, 24 in. (610 mm) in height, and 5.7 ft ² (0.53 m ²) in area
Level of access opening	Not over 12 in. (305 mm) above floor; steps if higher	Not over 12 in. (305 mm) above floor; steps if higher
Discharge to ground	Swinging stair section permitted if approved by authority having jurisdiction	Swinging stair section permitted if approved by authority having jurisdiction
Capacity	½ in. (13 mm) per person, if access by door; 1 in. (25 mm) per person, if access by climbing over windowsill	10 persons

7.2.8.4.2 Slip Resistance. Stair treads and landings of new or replacement fire escape stairs shall have slip-resistant surfaces.

7.2.8.5 Guards, Handrails, and Visual Enclosures.

7.2.8.5.1 All fire escape stairs shall have walls or guards and handrails on both sides in accordance with 7.2.2.4.

7.2.8.5.2 Replacement fire escape stairs in occupancies serving more than 10 occupants shall have visual enclosures to avoid any impediments to stair use by persons having a fear of high places. For stairs more than three stories in height, any arrangement intended to meet this requirement shall be at least 42 in. (1065 mm) in height.

7.2.8.6 Materials and Strength.

7.2.8.6.1 Noncombustible materials shall be used for the construction of all components of fire escape stairs.

7.2.8.6.2 The authority having jurisdiction shall be permitted to approve any existing fire escape stair that has been shown by load test or other satisfactory evidence to have adequate strength.

7.2.8.7* Swinging Stairs.

7.2.8.7.1 A single swinging stair section shall be permitted to terminate fire escape stairs over sidewalks, alleys, or driveways where it is impractical to make the termination with fire escape stairs.

7.2.8.7.2 Swinging stair sections shall not be located over doors, over the path of travel from any other exit, or in any locations where there are likely to be obstructions.

7.2.8.7.3 The width of swinging stair sections shall be at least that of the fire escape stairs above.

7.2.8.7.4 The pitch of swinging stair sections shall not exceed the pitch of the fire escape stairs above.

7.2.8.7.5 Guards and handrails shall be provided in accordance with 7.2.2.4 and shall be similar in height and construction to those used with the fire escape stairs above. Guards and handrails shall be designed to prevent any possibility of injury to persons where stairs swing downward. The clearance between moving sections and any other portion of the stair system where hands have the potential to be caught shall be not less than 4 in. (100 mm).

7.2.8.7.6 If the distance from the lowest platform to ground is not less than 12 ft (3660 mm), an intermediate balcony not more than 12 ft (3660 mm) from the ground and not less than 7 ft (2135 mm) in the clear underneath shall be provided, with width not less than that of the stairs and length not less than 48 in. (1220 mm).

7.2.8.7.7 Swinging stairs shall be counterbalanced about a pivot, and cables shall not be used. A weight of 150 lb (68 kg) located one step from the pivot shall not cause the stairs to swing downward, and a weight of 150 lb (68 kg) located one-quarter of the length of the swinging stairs from the pivot shall cause the stairs to swing down.

7.2.8.7.8 The pivot for swinging stairs shall be of a corrosion-resistant assembly or shall have clearances to prevent sticking due to corrosion.

7.2.8.7.9* Devices shall not be installed to lock a swinging stair section in the up position.

7.2.8.8 Intervening Spaces.

7.2.8.8.1 Where approved by the authority having jurisdiction, fire escape stairs shall be permitted to lead to an adjoining roof that is crossed before continuing downward travel. The direction of travel shall be clearly marked, and walkways with guards and handrails complying with 7.2.2.4 shall be provided.

7.2.8.8.2 Where approved by the authority having jurisdiction, fire escape stairs shall be permitted to be used in combination with inside or outside stairs complying with 7.2.2, provided that a continuous safe path of travel is maintained.

7.2.9 Fire Escape Ladders.

7.2.9.1 General. Fire escape ladders complying with 7.2.9.2 and 7.2.9.3 shall be permitted in the means of egress only where providing one of the following:

- (1) Access to unoccupied roof spaces as permitted in 7.2.8.3.4
- (2) Second means of egress from storage elevators as permitted in Chapter 42
- (3) Means of egress from towers and elevated platforms around machinery or similar spaces subject to occupancy not to exceed three persons who are all capable of using the ladder
- (4) Secondary means of egress from boiler rooms or similar spaces subject to occupancy not to exceed three persons who are all capable of using the ladder
- (5) Access to the ground from the lowest balcony or landing of a fire escape stair for small buildings as permitted in 7.2.8.4 where approved by the authority having jurisdiction

7.2.9.2 Construction and Installation.

7.2.9.2.1 Fire escape ladders shall comply with ANSI A14.3, *Safety Requirements for Fixed Ladders*, unless one of the following criteria is met:

- (1) Approved existing ladders complying with the edition of this *Code* that was in effect when the ladders were installed shall be permitted.
- (2) Industrial stairs complying with the minimum requirements for fixed stairs of ANSI A1264.1, *Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems*, shall be permitted where fire escape ladders are permitted in accordance with Chapter 40.

7.2.9.2.2 Ladders shall be installed with a pitch that exceeds 75 degrees.

7.2.9.3 Access. The lowest rung of any ladder shall not be more than 12 in. (305 mm) above the

level of the surface beneath it.

7.2.10 Slide Escapes.

7.2.10.1 General.

7.2.10.1.1 A slide escape shall be permitted as a component in a means of egress where permitted in Chapter 12 through Chapter 42.

7.2.10.1.2 Each slide escape shall be of an approved type.

7.2.10.2 Capacity.

7.2.10.2.1 Slide escapes, where permitted as a required means of egress, shall have a capacity of 60 persons.

7.2.10.2.2 Slide escapes shall not constitute more than 25 percent of the required egress capacity from any building or structure or any individual story thereof, unless otherwise provided for industrial occupancies in Chapter 40.

7.2.11* Alternating Tread Devices.

7.2.11.1 Alternating tread devices complying with 7.2.11.2 shall be permitted in the means of egress only where providing one of the following:

- (1) Access to unoccupied roof spaces as permitted in 7.2.8.3.4
- (2) Second means of egress from storage elevators as permitted in Chapter 42
- (3) Means of egress from towers and elevated platforms around machinery or similar spaces subject to occupancy not to exceed three persons who are all capable of using the alternating tread device
- (4) Secondary means of egress from boiler rooms or similar spaces subject to occupancy not to exceed three persons who are all capable of using the alternating tread device

7.2.11.2 Alternating tread devices shall comply with the following:

- (1) Handrails shall be provided on both sides of alternating tread devices in accordance with 7.2.2.4.4.
- (2) The clear width between handrails shall be not less than 17 in. (430 mm) and not more than 24 in. (610 mm).
- (3) Headroom shall be not less than 6 ft 8 in. (2030 mm).
- (4) The angle of the device shall be between 50 degrees and 68 degrees to horizontal.
- (5) The height of the riser shall not exceed 9½ in. (240 mm).
- (6) Treads shall have a projected tread depth of not less than 5 ⅙ in. (145 mm), measured in accordance with 7.2.2, with each tread providing 9½ in. (240 mm) of depth,

including tread overlap.

- (7) A distance of not less than 6 in. (150 mm) shall be provided between the stair handrail and any other object.
- (8) The initial tread of the stair shall begin at the same elevation as the platform, landing, or floor surface.
- (9) The alternating treads shall not be laterally separated by a distance of more than 2 in. (51 mm).
- (10) The occupant load served shall not exceed three.

7.2.12 Areas of Refuge.

7.2.12.1 General.

7.2.12.1.1 Unless otherwise provided in 7.2.12.1.2, an area of refuge used as part of a required accessible means of egress in accordance with 7.5.4, or used as a part of any required means of egress, shall conform to the following:

- (1) General requirements of Section 7.1
- (2) Requirements of 7.2.12.2 and 7.2.12.3

7.2.12.1.2 The requirements of 7.2.12.1.1(2) shall not apply to areas of refuge consisting of stories of buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

7.2.12.2 Accessibility.

7.2.12.2.1 Required portions of an area of refuge shall be accessible from the space they serve by an accessible means of egress.

7.2.12.2.2 Required portions of an area of refuge shall have access to a public way via an exit or an elevator without requiring return to the building spaces through which travel to the area of refuge occurred.

7.2.12.2.3* Where the exit providing egress from an area of refuge to a public way that is in accordance with 7.2.12.2.2 includes stairs, the clear width of landings and stair flights, measured between handrails and at all points below handrail height, shall be not less than 48 in. (1220 mm), unless otherwise permitted by the following:

- (1) The minimum 48 in. (1220 mm) clear width shall not be required where the area of refuge is separated from the remainder of the story by a horizontal exit meeting the requirements of 7.2.4. (*See also 7.2.12.3.4.*)
- (2)* For stairs where egress is in the descending direction, a clear width of not less than 37 in. (940 mm), measured at and below handrail height, shall be permitted where all of the following are met:

- (a) An approved stair descent device is provided on each floor served by the stair.
 - (b) Additional approved stair descent devices are provided on floors with an occupant load exceeding 200 at the ratio of one device per 200 occupants.
 - (c) The required approved stair descent devices are provided in an approved location on the floor.
- (3) Existing stairs and landings that provide a clear width of not less than 37 in. (940 mm), measured at and below handrail height, shall be permitted.

7.2.12.2.4* Where an elevator provides access from an area of refuge to a public way that is in accordance with 7.2.12.2.2, the following criteria shall be met:

- (1) The elevator shall be approved for fire fighters' emergency operations as provided in ASME A17.1, *Safety Code for Elevators and Escalators*.
- (2) The power supply shall be protected against interruption from fire occurring within the building but outside the area of refuge.
- (3) The elevator shall be located in a shaft system meeting the requirements for smokeproof enclosures in accordance with 7.2.3, unless otherwise provided in 7.2.12.2.4.1 and 7.2.12.2.4.2.

7.2.12.2.4.1 The smokeproof enclosure specified in 7.2.12.2.4(3) shall not be required for areas of refuge that are more than 1000 ft² (93 m²) and that are created by a horizontal exit meeting the requirements of 7.2.4.

7.2.12.2.4.2 The smokeproof enclosure specified in 7.2.12.2.4(3) shall not be required for elevators complying with 7.2.13.

7.2.12.2.5 The area of refuge shall be provided with a two-way communication system for communication between the area of refuge and a central control point. The door to the stair enclosure or the elevator door and the associated portion of the area of refuge that the stair enclosure door or elevator door serves shall be identified by signage. (*See 7.2.12.3.5.*)

7.2.12.2.6* Instructions for summoning assistance, via the two-way communication system, and written identification of the area of refuge location shall be posted adjacent to the two-way communication system.

7.2.12.3 Details.

7.2.12.3.1* Each area of refuge shall be sized to accommodate one wheelchair space of 30 in. × 48 in. (760 mm × 1220 mm) for every 200 occupants, or portion thereof, based on the occupant load served by the area of refuge. Such wheelchair spaces shall maintain the width of a means of egress to not less than that required for the occupant load served and to not less than 36 in. (915 mm).

7.2.12.3.2* For any area of refuge that does not exceed 1000 ft² (93 m²), it shall be

demonstrated by calculation or test that tenable conditions are maintained within the area of refuge for a period of 15 minutes when the exposing space on the other side of the separation creating the area of refuge is subjected to the maximum expected fire conditions.

7.2.12.3.3 Access to any designated wheelchair space in an area of refuge shall not pass through more than one adjoining wheelchair space.

7.2.12.3.4* Each area of refuge shall be separated from the remainder of the story by a barrier with not less than a 1-hour fire resistance rating, unless one of the following criteria applies:

- (1) A greater rating is required in other provisions of this *Code*.
- (2) The barrier is an existing barrier with a minimum 30-minute fire resistance rating.

7.2.12.3.4.1 New fire door assemblies serving an area of refuge shall be positive-pressure rated in accordance with 8.2.2.5.

7.2.12.3.4.2 The barriers specified in 7.2.12.3.4, and any openings in them, shall minimize air leakage and resist the passage of smoke.

7.2.12.3.4.3 Doors in the barriers specified in 7.2.12.3.4 shall have not less than a 20-minute fire protection rating, unless a greater rating is required in other provisions of this *Code*, and shall be either self-closing or automatic-closing in accordance with 7.2.1.8.

7.2.12.3.4.4 Ducts shall be permitted to penetrate the barrier specified in 7.2.12.3.4, unless prohibited in other provisions of this *Code*, and shall be provided with smoke-actuated dampers or other approved means to resist the transfer of smoke into the area of refuge.

7.2.12.3.5 Each area of refuge shall be identified by a sign that reads as the follows:

AREA OF REFUGE

7.2.12.3.5.1 The sign required by 7.2.12.3.5 shall conform to the requirements of ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, for such signage and shall display the international symbol of accessibility. Signs also shall be located as follows:

- (1) At each door providing access to the area of refuge
- (2) At all exits not providing an accessible means of egress, as defined in 3.3.151.1
- (3) Where necessary to indicate clearly the direction to an area of refuge

7.2.12.3.5.2 Signs required by 7.2.12.3.5 shall be illuminated as required for exit signs where exit sign illumination is required.

7.2.12.3.6 Tactile signage complying with ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*, shall be located at each door to an area of refuge.

7.2.13 Elevators.

7.2.13.1* General. An elevator complying with the requirements of Section 9.4 and 7.2.13 shall be permitted to be used as a second means of egress from a tower, as defined in 3.3.249, provided that the following criteria are met:

- (1) The tower and any attached structure shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
- (2) The tower shall be subject to occupancy not to exceed 90 persons.
- (3) Primary egress discharges shall be directly to the outside.
- (4) No high hazard content areas shall exist in the tower or attached structure.
- (5) One hundred percent of the egress capacity shall be provided independent of the elevators.
- (6) An evacuation plan that specifically includes the elevator shall be implemented, and staff personnel shall be trained in operations and procedures for elevator emergency use in normal operating mode prior to fire fighter recall.
- (7) The tower shall not be used by the general public.

7.2.13.2 Elevator Evacuation System Capacity.

7.2.13.2.1 The elevator car shall have a capacity of not less than eight persons.

7.2.13.2.2 The elevator lobby shall have a capacity of not less than 50 percent of the occupant load of the area served by the lobby. The capacity shall be calculated based on 3 ft² (0.28 m²) per person and shall also include one wheelchair space of 30 in. × 48 in. (760 mm × 1220 mm) for every 50 persons, or portion thereof, of the total occupant load served by that lobby.

7.2.13.3 Elevator Lobby. Every floor served by the elevator shall have an elevator lobby. Barriers forming the elevator lobby shall have a fire resistance rating of not less than 1 hour and shall be arranged as a smoke barrier in accordance with Section 8.5.

7.2.13.4 Elevator Lobby Doors. Elevator lobby doors shall have a fire protection rating of at least 1 hour. The transmitted temperature end point shall not exceed 450°F Δ (250°C Δ) above ambient at the end of 30 minutes of the fire exposure specified in the test method referenced in 8.3.3.2. Elevator lobby doors shall be self-closing or automatic-closing in accordance with 7.2.1.8.

7.2.13.5 Door Activation. The elevator lobby doors shall close in response to a signal from a smoke detector located directly outside the elevator lobby adjacent to or on each door opening. Elevator lobby doors shall be permitted to close in response to a signal from the building fire alarm system. Where one elevator lobby door closes by means of a smoke detector or a signal from the building fire alarm system, all elevator lobby doors serving that elevator evacuation system shall close.

7.2.13.6* Water Protection. Building elements shall be used to restrict water exposure of elevator equipment.

7.2.13.7* Power and Control Wiring. Elevator equipment, elevator communications, elevator machine room cooling, and elevator controller cooling shall be supplied by both normal and standby power. Wiring for power and control shall be located and properly protected to ensure at least 1 hour of operation in the event of a fire.

7.2.13.8* Communications. Two-way communication systems shall be provided between elevator lobbies and a central control point and between elevator cars and a central control point. Communications wiring shall be protected to ensure at least 1 hour of operation in the event of fire.

7.2.13.9* Elevator Operation. Elevators shall be provided with fire fighters' emergency operations in accordance with ASME A17.1, *Safety Code for Elevators and Escalators*.

7.2.13.10 Maintenance. Where an elevator lobby is served by only one elevator car, the elevator evacuation system shall have a program of scheduled maintenance during times of building shutdown or low building activity. Repairs shall be performed within 24 hours of breakdown.

7.2.13.11 Earthquake Protection. Elevators shall have the capability of orderly shutdowns during earthquakes at locations where such shutdowns are an option of ASME A17.1, *Safety Code for Elevators and Escalators*.

7.2.13.12 Signage. Signage shall comply with 7.10.8.4.

7.3 Capacity of Means of Egress.

7.3.1 Occupant Load.

7.3.1.1 Sufficient Capacity for Occupant Load. The total capacity of the means of egress for any story, balcony, tier, or other occupied space shall be sufficient for the occupant load thereof.

7.3.1.2* Occupant Load Factor. The occupant load in any building or portion thereof shall be not less than the number of persons determined by dividing the floor area assigned to that use by the occupant load factor for that use as specified in Table 7.3.1.2, Figure 7.3.1.2(a), and Figure 7.3.1.2(b). Where both gross and net area figures are given for the same occupancy, calculations shall be made by applying the gross area figure to the gross area of the portion of the building devoted to the use for which the gross area figure is specified and by applying the net area figure to the net area of the portion of the building devoted to the use for which the net area figure is specified.

Table 7.3.1.2 Occupant Load Factor

Use	(ft ² per person) ^a	(m ² per person) ^a
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Table 7.3.1.2 Occupant Load Factor

Use	(ft ² per person) ^a	(m ² per person) ^a
Assembly Use		
Concentrated use, without fixed seating	7 net	0.65 net
Less concentrated use, without fixed seating	15 net	1.4 net
Bench-type seating	1 person/18 linear in.	1 person/455 linear mm
Fixed seating	Number of fixed seats	Number of fixed seats
Waiting spaces	See 12.1.7.2 and 13.1.7.2.	See 12.1.7.2 and 13.1.7.2.
Kitchens	100	9.3
Library stack areas	100	9.3
Library reading rooms	50 net	4.6 net
Swimming pools	50 (water surface)	4.6 (water surface)
Swimming pool decks	30	2.8
Exercise rooms with equipment	50	4.6
Exercise rooms without equipment	15	1.4
Stages	15 net	1.4 net
Lighting and access catwalks, galleries, gridirons	100 net	9.3 net
Casinos and similar gaming areas	11	1
Skating rinks	50	4.6
Educational Use		
Classrooms	20 net	1.9 net
Shops, laboratories, vocational rooms	50 net	4.6 net
Day-Care Use	35 net	3.3 net
Health Care Use		
Inpatient treatment departments	240	22.3
Sleeping departments	120	11.1

Table 7.3.1.2 Occupant Load Factor

Use	(ft ² per person) ^a	(m ² per person) ^a
Ambulatory health care	100	9.3
Detention and Correctional Use	120	11.1
Residential Use		
Hotels and dormitories	200	18.6
Apartment buildings	200	18.6
Board and care, large	200	18.6
Industrial Use		
General and high-hazard industrial	100	9.3
Special-purpose industrial	NA	NA
Business Use	100	9.3
Storage Use		
In storage occupancies	NA	NA
In mercantile occupancies	300	27.9
In other than storage and mercantile occupancies	500	46.5
Mercantile Use		
Sales area on street floor ^{b,c}	30	2.8
Sales area on two or more street floors ^c	40	3.7
Sales area on floor below street floor ^c	30	2.8
Sales area on floors above street floor ^c	60	5.6
Floors or portions of floors used only for offices	See business use.	See business use.

Table 7.3.1.2 Occupant Load Factor

Use	(ft ² per person) ^a	(m ² per person) ^a
Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public	300	27.9
Mall buildings ^d	Per factors applicable to use of space ^e	Per factors applicable to use of space ^e

NA: Not applicable. The occupant load is the maximum probable number of occupants present at any time.

^aAll factors are expressed in gross area unless marked “net.”

^bFor the purpose of determining occupant load in mercantile occupancies where, due to differences in grade of streets on different sides, two or more floors directly accessible from streets (not including alleys or similar back streets) exist, each such floor is permitted to be considered a street floor. The occupant load factor is one person for each 40 ft² (3.7 m²) of gross floor area of sales space.

^cFor the purpose of determining occupant load in mercantile occupancies with no street floor, as defined in 3.3.239, but with access directly from the street by stairs or escalators, the floor at the point of entrance to the mercantile occupancy is considered the street floor.

^dFor any food court or other assembly use areas located in the mall that are not included as a portion of the gross leasable area of the mall building, the occupant load is calculated based on the occupant load factor for that use as specified in Table 7.3.1.2. The remaining mall area is not required to be assigned an occupant load.

^eThe portions of the mall that are considered a pedestrian way and not used as gross leasable area are not required to be assessed an occupant load based on Table 7.3.1.2. However, means of egress from a mall pedestrian way are required to be provided for an occupant load determined by dividing the gross leasable area of the mall building (not including anchor stores) by the appropriate lowest whole number occupant load factor from Figure 7.3.1.2(a) or Figure 7.3.1.2(b).

Each individual tenant space is required to have means of egress to the outside or to the mall based on occupant loads calculated by using the appropriate occupant load factor from Table 7.3.1.2.

Each individual anchor store is required to have means of egress independent of the mall.

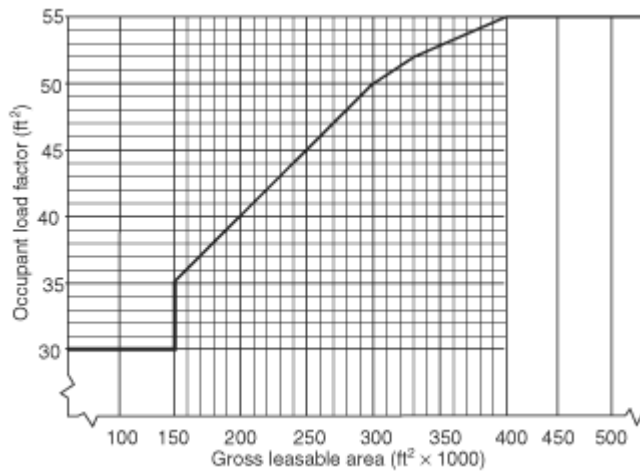


FIGURE 7.3.1.2(a) Mall Building Occupant Load Factors (U.S. Customary Units).

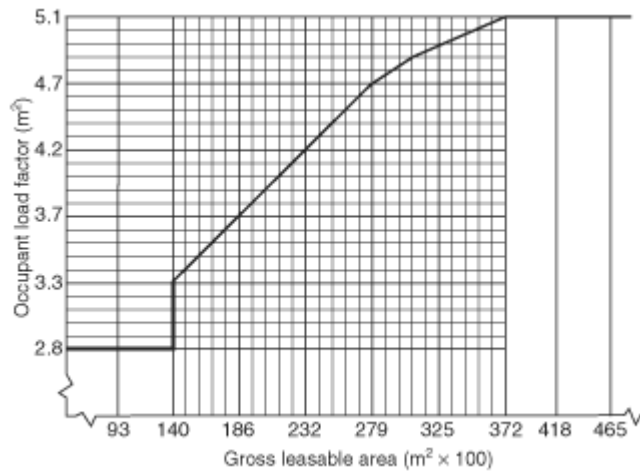


FIGURE 7.3.1.2(b) Mall Building Occupant Load Factors (SI Units).

7.3.1.3 Occupant Load Increases.

7.3.1.3.1 The occupant load in any building or portion thereof shall be permitted to be increased from the occupant load established for the given use in accordance with 7.3.1.2 where all other requirements of this *Code* are also met, based on such increased occupant load.

7.3.1.3.2 The authority having jurisdiction shall be permitted to require an approved aisle, seating, or fixed equipment diagram to substantiate any increase in occupant load and shall be permitted to require that such a diagram be posted in an approved location.

7.3.1.4 Exits Serving More than One Story. Where an exit serves more than one story, only the occupant load of each story considered individually shall be used in computing the required capacity of the exit at that story, provided that the required egress capacity of the exit is not

decreased in the direction of egress travel.

7.3.1.5 Capacity from a Point of Convergence. Where means of egress from a story above and a story below converge at an intermediate story, the capacity of the means of egress from the point of convergence shall be not less than the sum of the capacity of the two means of egress.

7.3.1.6 Egress Capacity from Balconies and Mezzanines. Where any required egress capacity from a balcony or mezzanine passes through the room below, that required capacity shall be added to the required egress capacity of the room below.

7.3.2 Measurement of Means of Egress.

7.3.2.1 The width of means of egress shall be measured in the clear at the narrowest point of the egress component under consideration, unless otherwise provided in 7.3.2.2 or 7.3.2.3.

7.3.2.2 Projections within the means of egress of not more than 4½ in. (114 mm) on each side shall be permitted at a height of 38 in. (965 mm) and below.

7.3.2.3 In health care and ambulatory health care occupancies, projections shall be permitted in corridors in accordance with Chapter 18 through Chapter 21.

7.3.3 Egress Capacity.

7.3.3.1 Egress capacity for approved components of means of egress shall be based on the capacity factors shown in Table 7.3.3.1.

Table 7.3.3.1 Capacity Factors

Area	Stairways (width per person)		Level Components and Ramps (width per person)	
	in.	mm	in.	mm
Board and care	0.4	10	0.2	5
Health care, sprinklered	0.3	7.6	0.2	5
Health care, nonsprinklered	0.6	15	0.5	13
High hazard contents	0.7	18	0.4	10
All others	0.3	7.6	0.2	5

7.3.3.2 The required capacity of a corridor shall be the occupant load that utilizes the corridor for exit access divided by the required number of exits to which the corridor connects, but the corridor capacity shall be not less than the required capacity of the exit to which the corridor leads.

7.3.4 Minimum Width.

7.3.4.1 The width of any means of egress, unless otherwise provided in 7.3.4.1.1 through 7.3.4.1.3, shall be as follows:

- (1) Not less than that required for a given egress component in this chapter or Chapter 12 through Chapter 42
- (2) Not less than 36 in. (915 mm)

7.3.4.1.1* The width of exit access that is formed by furniture and movable partitions, that serves not more than six people, and that has a length not exceeding 50 ft (15 m) shall meet both of the following criteria:

- (1) The width shall be not less than 18 in. (455 mm), at and below a height of 38 in. (965 mm), and not less than 28 in. (710 mm) above a height of 38 in. (965 mm).
- (2) A width of not less than 36 in. (915 mm) for new exit access, and not less than 28 in. (710 mm) for existing exit access, shall be capable of being provided without moving permanent walls.

7.3.4.1.2 In existing buildings, the width of exit access shall be permitted to be not less than 28 in. (710 mm).

7.3.4.1.3 The requirement of 7.3.4.1 shall not apply to the following:

- (1) Doors as otherwise provided for in 7.2.1.2
- (2) Aisles and aisle accessways in assembly occupancies as otherwise provided in Chapter 12 and Chapter 13
- (3) Industrial equipment access as otherwise provided in 40.2.5.2

7.3.4.2 Where a single exit access leads to an exit, its capacity in terms of width shall be not less than the required capacity of the exit to which it leads.

7.3.4.3 Where more than one exit access leads to an exit, each shall have a width adequate for the number of persons it accommodates.

7.4 Number of Means of Egress.

7.4.1 General.

7.4.1.1 The number of means of egress from any balcony, mezzanine, story, or portion thereof shall be not less than two, except under one of the following conditions:

- (1) Where a single means of egress is permitted in Chapter 11 through Chapter 42
- (2) Where a single means of egress is permitted for a mezzanine or balcony and the common path of travel limitations of Chapter 12 through Chapter 42 are met

7.4.1.2 The number of means of egress from any story or portion thereof, other than for existing buildings as permitted in Chapter 12 through Chapter 42, shall be as follows:

- (1) Occupant load more than 500 but not more than 1000 — not less than 3
- (2) Occupant load more than 1000 — not less than 4

7.4.1.3 Accessible means of egress in accordance with 7.5.4 that do not utilize elevators shall be permitted to serve as any or all of the required minimum number of means of egress.

7.4.1.4 The occupant load of each story considered individually shall be required to be used in computing the number of means of egress at each story, provided that the required number of means of egress is not decreased in the direction of egress travel.

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

7.4.1.6 Elevator lobbies shall have access to at least one exit. Such exit access shall not require the use of a key, a tool, special knowledge, or special effort.

7.5 Arrangement of Means of Egress.

7.5.1 General.

7.5.1.1 Exits shall be located and exit access shall be arranged so that exits are readily accessible at all times.

7.5.1.1.1* Where exits are not immediately accessible from an open floor area, continuous passageways, aisles, or corridors leading directly to every exit shall be maintained and shall be arranged to provide access for each occupant to not less than two exits by separate ways of travel, unless otherwise provided in 7.5.1.1.3 and 7.5.1.1.4.

7.5.1.1.2 Exit access corridors shall provide access to not less than two approved exits, unless otherwise provided in 7.5.1.1.3 and 7.5.1.1.4.

7.5.1.1.3 The requirements of 7.5.1.1.1 and 7.5.1.1.2 shall not apply where a single exit is permitted in Chapter 12 through Chapter 42.

7.5.1.1.4 Where common paths of travel are permitted for an occupancy in Chapter 12 through Chapter 42, such common paths of travel shall be permitted but shall not exceed the limit specified.

7.5.1.2 Corridors shall provide exit access without passing through any intervening rooms other than corridors, lobbies, and other spaces permitted to be open to the corridor, unless otherwise provided in 7.5.1.2.1 and 7.5.1.2.2.

7.5.1.2.1 Approved existing corridors that require passage through a room to access an exit shall be permitted to continue to be used, provided that the following criteria are met:

- (1) The path of travel is marked in accordance with Section 7.10.
- (2) Doors to such rooms comply with 7.2.1.
- (3) Such arrangement is not prohibited by the applicable occupancy chapter.

7.5.1.2.2 Corridors that are not required to be fire resistance rated shall be permitted to discharge into open floor plan areas.

7.5.1.3 Remoteness shall be provided in accordance with 7.5.1.3.1 through 7.5.1.3.7.

7.5.1.3.1 Where more than one exit is required from a building or portion thereof, such exits shall be remotely located from each other and shall be arranged and constructed to minimize the possibility that more than one has the potential to be blocked by any one fire or other emergency condition.

7.5.1.3.2* Where two exits or exit access doors are required, they shall be located at a distance from one another not less than one-half the length of the maximum overall diagonal dimension of the building or area to be served, measured in a straight line between the nearest edge of the exit doors or exit access doors, unless otherwise provided in 7.5.1.3.3 through 7.5.1.3.5.

7.5.1.3.3 In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7, the minimum separation distance between two exits or exit access doors measured in accordance with 7.5.1.3.2 shall be not less than one-third the length of the maximum overall diagonal dimension of the building or area to be served.

7.5.1.3.4 Where exit enclosures are provided as the required exits specified in 7.5.1.3.2 or 7.5.1.3.3 and are interconnected by not less than a 1-hour fire resistance-rated corridor, exit separation shall be permitted to be measured along the line of travel within the corridor.

7.5.1.3.5 In existing buildings, where more than one exit or exit access door is required, such exits or exit access doors shall be permitted to be remotely located in accordance with 7.5.1.3.1.

7.5.1.3.6 Where more than two exits or exit access doors are required, at least two of the required exits or exit access doors shall be arranged to comply with the minimum separation distance requirement.

7.5.1.3.7 The balance of the exits or exit access doors specified in 7.5.1.3.6 shall be located so that, if one becomes blocked, the others shall be available.

7.5.1.4 Interlocking or scissor stairs shall comply with 7.5.1.4.1 and 7.5.1.4.2.

7.5.1.4.1 New interlocking or scissor stairs shall be permitted to be considered only as a single exit.

7.5.1.4.2* Existing interlocking or scissor stairs shall be permitted to be considered separate exits, provided that they meet the following criteria:

- (1) They are enclosed in accordance with 7.1.3.2.

- (2) They are separated from each other by 2-hour fire resistance-rated noncombustible construction.
- (3) No protected or unprotected penetrations or communicating openings exist between the stair enclosures.

7.5.1.5* Exit access shall be arranged so that there are no dead ends in corridors, unless permitted by, and limited to the lengths specified in, Chapter 12 through Chapter 42.

7.5.1.6 Exit access from rooms or spaces shall be permitted to be through adjoining or intervening rooms or areas, provided that such rooms or areas are accessory to the area served. Foyers, lobbies, and reception rooms constructed as required for corridors shall not be construed as intervening rooms. Exit access shall be arranged so that it is not necessary to pass through any area identified under Protection from Hazards in Chapter 11 through Chapter 42.

7.5.2 Impediments to Egress. See also 7.1.9 and 7.2.1.5.

7.5.2.1* Access to an exit shall not be through kitchens, storerooms other than as provided in Chapter 36 and Chapter 37, restrooms, workrooms, closets, bedrooms or similar spaces, or other rooms or spaces subject to locking, unless passage through such rooms or spaces is permitted for the occupancy by Chapter 18, 19, 22, or 23.

7.5.2.2* Exit access and exit doors shall be designed and arranged to be clearly recognizable.

7.5.2.2.1 Hangings or draperies shall not be placed over exit doors or located so that they conceal or obscure any exit, unless otherwise provided in 7.5.2.2.2.

7.5.2.2.2 Curtains shall be permitted across means of egress openings in tent walls, provided that the following criteria are met:

- (1) They are distinctly marked in contrast to the tent wall so as to be recognizable as means of egress.
- (2) They are installed across an opening that is at least 6 ft (1830 mm) in width.
- (3) They are hung from slide rings or equivalent hardware so as to be readily moved to the side to create an unobstructed opening in the tent wall that is of the minimum width required for door openings.

7.5.3 Exterior Ways of Exit Access.

7.5.3.1 Exit access shall be permitted to be by means of any exterior balcony, porch, gallery, or roof that conforms to the requirements of this chapter.

7.5.3.2 The long side of the balcony, porch, gallery, or similar space shall be at least 50 percent open and shall be arranged to restrict the accumulation of smoke.

7.5.3.3 Exterior exit access balconies shall be separated from the interior of the building by walls and opening protectives as required for corridors, unless the exterior exit access balcony

is served by at least two remote stairs that can be accessed without any occupant traveling past an unprotected opening to reach one of the stairs, or unless dead ends on the exterior exit access do not exceed 20 ft (6100 mm).

7.5.3.4 Exterior exit access shall be arranged so that there are no dead ends in excess of those permitted for dead-end corridors in Chapter 11 through Chapter 42.

7.5.4 Accessible Means of Egress.

7.5.4.1* Areas accessible to people with severe mobility impairment, other than in existing buildings, shall have not less than two accessible means of egress, unless otherwise provided in 7.5.4.1.2 through 7.5.4.1.4.

7.5.4.1.1 Access within the allowable travel distance shall be provided to not less than one accessible area of refuge or one accessible exit providing an accessible route to an exit discharge.

7.5.4.1.2 A single accessible means of egress shall be permitted from buildings or areas of buildings permitted to have a single exit.

7.5.4.1.3 Accessible means of egress shall not be required in health care occupancies protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

7.5.4.1.4 Exit access travel along the accessible means of egress shall be permitted to be common for the distances permitted as common paths of travel.

7.5.4.2 Where two accessible means of egress are required, the exits serving such means of egress shall be located at a distance from one another not less than one-half the length of the maximum overall diagonal dimension of the building or area to be served. This distance shall be measured in a straight line between the nearest edge of the exit doors or exit access doors, unless otherwise provided in 7.5.4.2.1 through 7.5.4.2.3.

7.5.4.2.1 Where exit enclosures are provided as the required exits specified in 7.5.4.2 and are interconnected by not less than a 1-hour fire resistance-rated corridor, exit separation shall be permitted to be measured along the line of travel within the corridor.

7.5.4.2.2 The requirement of 7.5.4.2 shall not apply to buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

7.5.4.2.3 The requirement of 7.5.4.2 shall not apply where the physical arrangement of means of egress prevents the possibility that access to both accessible means of egress will be blocked by any one fire or other emergency condition as approved by the authority having jurisdiction.

7.5.4.3 Each required accessible means of egress shall be continuous from each accessible occupied area to a public way or area of refuge in accordance with 7.2.12.2.2.

7.5.4.4 Where an exit stair is used in an accessible means of egress, it shall comply with 7.2.12.2.3 and either shall incorporate an area of refuge within an enlarged story-level landing

or shall be accessed from an area of refuge.

7.5.4.5 To be considered part of an accessible means of egress, an elevator shall be in accordance with 7.2.12.2.4.

7.5.4.6 To be considered part of an accessible means of egress, a smoke barrier in accordance with Section 8.5 with not less than a 1-hour fire resistance rating, or a horizontal exit in accordance with 7.2.4, shall discharge to an area of refuge in accordance with 7.2.12.

7.5.4.7 Accessible stories that are four or more stories above or below a story of exit discharge shall have not less than one elevator complying with 7.5.4.5, except as modified in 7.5.4.8.

7.5.4.8 Where elevators are required by 7.5.4.7, the smokeproof enclosure required by 7.2.12.2.4 shall not be required in buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1).

7.5.4.9 An area of refuge used as part of a required accessible means of egress shall be in accordance with 7.2.12.

7.6* Measurement of Travel Distance to Exits.

7.6.1* The travel distance to an exit shall be measured on the floor or other walking surface as follows:

- (1) Along the centerline of the natural path of travel, starting from the most remote point subject to occupancy
- (2) Curving around any corners or obstructions, with a 12-in. (305-mm) clearance therefrom
- (3) Terminating at one of the following:
 - (a) Center of the doorway
 - (b) Other point at which the exit begins
 - (c) Smoke barrier in an existing detention and correctional occupancy as provided in Chapter 23

7.6.2* Where open stairways or ramps are permitted as a path of travel to required exits, the distance shall include the travel on the stairway or ramp and the travel from the end of the stairway or ramp to an outside door or other exit in addition to the distance traveled to reach the stairway or ramp.

7.6.3 Where any part of an exterior exit is within 10 ft (3050 mm) of horizontal distance of any unprotected building opening, as permitted by 7.2.2.6.3 for outside stairs, the travel distance to the exit shall include the length of travel to ground level.

7.6.4 Where measurement includes stairs, the measurement shall be taken in the plane of the tread nosing.

7.6.5 The travel distance in any occupied space to not less than one exit, measured in accordance with 7.6.1 through 7.6.4, shall not exceed the limits specified in this *Code*. (See 7.6.6.)

7.6.6 Travel distance limitations shall be as provided in Chapter 11 through Chapter 42 and, for high hazard areas, shall be in accordance with Section 7.11.

7.7 Discharge from Exits.

7.7.1* Exit Termination. Exits shall terminate directly, at a public way or at an exterior exit discharge, unless otherwise provided in 7.7.1.2 through 7.7.1.4.

7.7.1.1 Yards, courts, open spaces, or other portions of the exit discharge shall be of the required width and size to provide all occupants with a safe access to a public way.

7.7.1.2 The requirement of 7.7.1 shall not apply to interior exit discharge as otherwise provided in 7.7.2.

7.7.1.3 The requirement of 7.7.1 shall not apply to rooftop exit discharge as otherwise provided in 7.7.6.

7.7.1.4 Means of egress shall be permitted to terminate in an exterior area of refuge for detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23.

7.7.2 Discharge through Areas on Level of Exit Discharge. Not more than 50 percent of the required number of exits, and not more than 50 percent of the required egress capacity, shall discharge through areas on the level of exit discharge, unless otherwise permitted in 7.7.2.1 and 7.7.2.2, and provided that the criteria of 7.7.2.3 through 7.7.2.7 also are met.

7.7.2.1 One hundred percent of the exits shall be permitted to discharge through areas on the level of exit discharge in detention and correctional occupancies as otherwise provided in Chapter 22 and Chapter 23.

7.7.2.2 In existing buildings, the 50 percent limit on egress capacity shall not apply if the 50 percent limit on the required number of exits is met.

7.7.2.3 The discharge specified in 7.7.2 shall lead to a free and unobstructed way to the exterior of the building, and such way shall be readily visible and identifiable from the point of discharge from the exit.

7.7.2.4 The level of discharge shall be protected throughout by an approved, automatic sprinkler system in accordance with Section 9.7, or the portion of the level of discharge used for discharge shall be protected by an approved, automatic sprinkler system in accordance with Section 9.7 and shall be separated from the nonsprinklered portion of the floor by a fire resistance rating meeting the requirements for the enclosure of exits. (See 7.1.3.2.1.)

7.7.2.5 The requirement of 7.7.2.4 shall not apply where the discharge area is a vestibule or foyer that meets all of the following criteria:

- (1) The depth from the exterior of the building shall be not more than 10 ft (3050 mm), and the length shall be not more than 30 ft (9140 mm).
- (2) The foyer shall be separated from the remainder of the level of discharge by construction providing protection not less than the equivalent of wired glass in steel frames.
- (3) The foyer shall serve only as means of egress and shall include an exit directly to the outside.

7.7.2.6 The entire area on the level of discharge shall be separated from areas below by construction having a fire resistance rating not less than that required for the exit enclosure, unless otherwise provided in 7.7.2.7.

7.7.2.7 Levels below the level of discharge in an atrium shall be permitted to be open to the level of discharge where such level of discharge is protected in accordance with 8.6.7.

7.7.3 Arrangement and Marking of Exit Discharge. The exit discharge shall be arranged and marked to make clear the direction of egress to a public way. Stairs shall be arranged so as to make clear the direction of egress to a public way. Stairs that continue more than one-half story beyond the level of exit discharge shall be interrupted at the level of exit discharge by partitions, doors, or other effective means.

7.7.4 Components of Exit Discharge. Doors, stairs, ramps, corridors, exit passageways, bridges, balconies, escalators, moving walks, and other components of an exit discharge shall comply with the detailed requirements of this chapter for such components.

7.7.5 Signs. See 7.2.2.5.4.

7.7.6 Discharge to Roofs. Where approved by the authority having jurisdiction, exits shall be permitted to discharge to roofs or other sections of the building or an adjoining building where the following criteria are met:

- (1) The roof/ceiling assembly construction has a fire resistance rating not less than that required for the exit enclosure.
- (2) A continuous and safe means of egress from the roof is available.

7.8 Illumination of Means of Egress.

7.8.1 General.

7.8.1.1* Illumination of means of egress shall be provided in accordance with Section 7.8 for every building and structure where required in Chapter 11 through Chapter 42. For the purposes of this requirement, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For the purposes of this requirement, exit discharge shall include only designated stairs, aisles, corridors, ramps, escalators, walkways, and exit passageways leading to a public way.

7.8.1.2 Illumination of means of egress shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use, unless otherwise provided in 7.8.1.2.2.

7.8.1.2.1 Artificial lighting shall be employed at such locations and for such periods of time as are necessary to maintain the illumination to the minimum criteria values herein specified.

7.8.1.2.2 Automatic, motion sensor–type lighting switches shall be permitted within the means of egress, provided that the switch controllers are equipped for fail-safe operation, the illumination timers are set for a minimum 15-minute duration, and the motion sensor is activated by any occupant movement in the area served by the lighting units.

7.8.1.3* The floors and other walking surfaces within an exit and within the portions of the exit access and exit discharge designated in 7.8.1.1 shall be illuminated as follows:

- (1) During conditions of stair use, the minimum illumination for new stairs shall be at least 10 ft-candle (108 lux), measured at the walking surfaces.
- (2) The minimum illumination for floors and walking surfaces, other than new stairs during conditions of stair use, shall be to values of at least 1 ft-candle (10.8 lux), measured at the floor.
- (3) In assembly occupancies, the illumination of the floors of exit access shall be at least 0.2 ft-candle (2.2 lux) during periods of performances or projections involving directed light.
- (4)* The minimum illumination requirements shall not apply where operations or processes require low lighting levels.

7.8.1.4* Required illumination shall be arranged so that the failure of any single lighting unit does not result in an illumination level of less than 0.2 ft-candle (2.2 lux) in any designated area.

7.8.1.5 The equipment or units installed to meet the requirements of Section 7.10 also shall be permitted to serve the function of illumination of means of egress, provided that all requirements of Section 7.8 for such illumination are met.

7.8.2 Sources of Illumination.

7.8.2.1* Illumination of means of egress shall be from a source considered reliable by the authority having jurisdiction.

7.8.2.2 Battery-operated electric lights and other types of portable lamps or lanterns shall not be used for primary illumination of means of egress. Battery-operated electric lights shall be permitted to be used as an emergency source to the extent permitted under Section 7.9.

7.9 Emergency Lighting.

7.9.1 General.

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7.9.1.1* Emergency lighting facilities for means of egress shall be provided in accordance with Section 7.9 for the following:

- (1) Buildings or structures where required in Chapter 11 through Chapter 42
- (2) Underground and limited access structures as addressed in Section 11.7
- (3) High-rise buildings as required by other sections of this *Code*
- (4) Doors equipped with delayed-egress locks
- (5) Stair shaft and vestibule of smokeproof enclosures, for which the following also apply:
 - (a) The stair shaft and vestibule shall be permitted to include a standby generator that is installed for the smokeproof enclosure mechanical ventilation equipment.
 - (b) The standby generator shall be permitted to be used for the stair shaft and vestibule emergency lighting power supply.
- (6) New access-controlled egress doors in accordance with 7.2.1.6.2.

7.9.1.2 For the purposes of 7.9.1.1, exit access shall include only designated stairs, aisles, corridors, ramps, escalators, and passageways leading to an exit. For the purposes of 7.9.1.1, exit discharge shall include only designated stairs, ramps, aisles, walkways, and escalators leading to a public way.

7.9.1.3 Where maintenance of illumination depends on changing from one energy source to another, a delay of not more than 10 seconds shall be permitted.

7.9.2 Performance of System.

7.9.2.1* Emergency illumination shall be provided for not less than 1½ hours in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 ft-candle (10.8 lux) and, at any point, not less than 0.1 ft-candle (1.1 lux), measured along the path of egress at floor level. Illumination levels shall be permitted to decline to not less than an average of 0.6 ft-candle (6.5 lux) and, at any point, not less than 0.06 ft-candle (0.65 lux) at the end of the 1½ hours. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

7.9.2.2 New emergency power systems for emergency lighting shall be at least Type 10, Class 1.5, Level 1, in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*.

7.9.2.3* The emergency lighting system shall be arranged to provide the required illumination automatically in the event of any interruption of normal lighting due to any of the following:

- (1) Failure of a public utility or other outside electrical power supply
- (2) Opening of a circuit breaker or fuse
- (3) Manual act(s), including accidental opening of a switch controlling normal lighting

facilities

7.9.2.4 Emergency generators providing power to emergency lighting systems shall be installed, tested, and maintained in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*. Stored electrical energy systems, where required in this *Code*, shall be installed and tested in accordance with NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*.

7.9.2.5 Unit equipment and battery systems for emergency luminaires shall be listed to UL 924, *Standard for Emergency Lighting and Power Equipment*.

7.9.2.6* Existing battery-operated emergency lights shall use only reliable types of rechargeable batteries provided with suitable facilities for maintaining them in properly charged condition. Batteries used in such lights or units shall be approved for their intended use and shall comply with NFPA 70, *National Electrical Code*.

7.9.2.7 The emergency lighting system shall be either continuously in operation or shall be capable of repeated automatic operation without manual intervention.

7.9.3 Periodic Testing of Emergency Lighting Equipment.

7.9.3.1 Required emergency lighting systems shall be tested in accordance with one of the three options offered by 7.9.3.1.1, 7.9.3.1.2, or 7.9.3.1.3.

7.9.3.1.1 Testing of required emergency lighting systems shall be permitted to be conducted as follows:

- (1) Functional testing shall be conducted at 30-day intervals for not less than 30 seconds.
- (2) Functional testing shall be conducted annually for not less than 1½ hours if the emergency lighting system is battery powered.
- (3) The emergency lighting equipment shall be fully operational for the duration of the tests required by 7.9.3.1.1(1) and 7.9.3.1.1(2).
- (4) Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

7.9.3.1.2 Testing of required emergency lighting systems shall be permitted to be conducted as follows:

- (1) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall be provided.
- (2) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall automatically perform not less than once every 30 days a test for not less than 30 seconds and a diagnostic routine.
- (3) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall indicate failures by a status indicator.

- (4) A visual inspection shall be performed at intervals not exceeding 30 days.
- (5) Functional testing shall be conducted annually for not less than 1½ hours.
- (6) Self-testing/self-diagnostic battery-operated emergency lighting equipment shall be fully operational for the duration of the 1½ hour test.
- (7) Written records of visual inspections and tests shall be kept by the owner for inspection by the authority having jurisdiction.

7.9.3.1.3 Testing of required emergency lighting systems shall be permitted to be conducted as follows:

- (1) Computer-based, self-testing/self-diagnostic battery-operated emergency lighting equipment shall be provided.
- (2) The emergency lighting equipment shall automatically perform not less than once every 30 days a test for not less than 30 seconds and a diagnostic routine.
- (3) The emergency lighting equipment shall automatically perform annually a test for not less than 1½ hours.
- (4) The emergency lighting equipment shall be fully operational for the duration of the tests required by 7.9.3.1.3(2) and 7.9.3.1.3(3).
- (5) The computer-based system shall be capable of providing a report of the history of tests and failures at all times.

7.10 Marking of Means of Egress.

7.10.1 General.

7.10.1.1 Where Required. Means of egress shall be marked in accordance with Section 7.10 where required in Chapter 11 through Chapter 42.

7.10.1.2* Exits. Exits, other than main exterior exit doors that obviously and clearly are identifiable as exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

7.10.1.3 Exit Door Tactile Signage. Tactile signage shall be provided to meet the following criteria, unless otherwise provided in 7.10.1.4:

- (1) Tactile signage shall be located at each exit door requiring an exit sign.
- (2) Tactile signage shall read as follows: EXIT.
- (3) Tactile signage shall comply with ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

7.10.1.4 Existing Exemption. The requirements of 7.10.1.3 shall not apply to existing buildings, provided that the occupancy classification does not change.

7.10.1.5 Exit Access.

7.10.1.5.1 Access to exits shall be marked by approved, readily visible signs in all cases where the exit or way to reach the exit is not readily apparent to the occupants.

7.10.1.5.2* New sign placement shall be such that no point in an exit access corridor is in excess of the rated viewing distance or 100 ft (30 m), whichever is less, from the nearest sign.

7.10.1.6* Floor Proximity Exit Signs. Where floor proximity exit signs are required in Chapter 11 through Chapter 42, such signs shall be located near the floor level in addition to those signs required for doors or corridors. The signs shall be illuminated in accordance with 7.10.5. Externally illuminated signs shall be sized in accordance with 7.10.6.1. The bottom of the sign shall be not less than 6 in. (150 mm), but not more than 18 in. (455 mm), above the floor. For exit doors, the sign shall be mounted on the door or adjacent to the door, with the nearest edge of the sign within 4 in. (100 mm) of the door frame.

7.10.1.7* Floor Proximity Egress Path Marking. Where floor proximity egress path marking is required in Chapter 11 through Chapter 42, a listed and approved floor proximity egress path marking system that is internally illuminated shall be installed within 18 in. (455 mm) of the floor. The system shall provide a visible delineation of the path of travel along the designated exit access and shall be essentially continuous, except as interrupted by doorways, hallways, corridors, or other such architectural features. The system shall operate continuously or at any time the building fire alarm system is activated. The activation, duration, and continuity of operation of the system shall be in accordance with 7.9.2. The system shall be maintained in accordance with the product manufacturing listing.

7.10.1.8* Visibility. Every sign required in Section 7.10 shall be located and of such size, distinctive color, and design that it is readily visible and shall provide contrast with decorations, interior finish, or other signs. No decorations, furnishings, or equipment that impairs visibility of a sign shall be permitted. No brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision of the required exit sign that could detract attention from the exit sign shall be permitted.

7.10.1.9 Mounting Location. The bottom of new egress markings shall be located at a vertical distance of not more than 6 ft 8 in. (2030 mm) above the top edge of the egress opening intended for designation by that marking. Egress markings shall be located at a horizontal distance of not more than the required width of the egress opening, as measured from the edge of the egress opening intended for designation by that marking to the nearest edge of the marking.

7.10.2* Directional Signs. A sign complying with 7.10.3 with a directional indicator showing the direction of travel shall be placed in every location where the direction of travel to reach the nearest exit is not apparent.

7.10.3* Sign Legend.

7.10.3.1 Signs required by 7.10.1 and 7.10.2 shall read as follows in plainly legible letters, or

other appropriate wording shall be used:

EXIT

7.10.3.2* Where approved by the authority having jurisdiction, pictograms shall be permitted.

7.10.4* Power Source. Where emergency lighting facilities are required by the applicable provisions of Chapter 11 through Chapter 42 for individual occupancies, the signs, other than approved self-luminous signs and listed photoluminescent signs in accordance with 7.10.7.2, shall be illuminated by the emergency lighting facilities. The level of illumination of the signs shall be in accordance with 7.10.6.3 or 7.10.7 for the required emergency lighting duration as specified in 7.9.2.1. However, the level of illumination shall be permitted to decline to 60 percent at the end of the emergency lighting duration.

7.10.5 Illumination of Signs.

7.10.5.1* General. Every sign required by 7.10.1.2, 7.10.1.5, or 7.10.8.1, other than where operations or processes require low lighting levels, shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode.

7.10.5.2* Continuous Illumination.

7.10.5.2.1 Every sign required to be illuminated by 7.10.6.3, 7.10.7, and 7.10.8.1 shall be continuously illuminated as required under the provisions of Section 7.8, unless otherwise provided in 7.10.5.2.2.

7.10.5.2.2* Illumination for signs shall be permitted to flash on and off upon activation of the fire alarm system.

7.10.6 Externally Illuminated Signs.

7.10.6.1* Size of Signs.

7.10.6.1.1 Externally illuminated signs required by 7.10.1 and 7.10.2, other than approved existing signs, unless otherwise provided in 7.10.6.1.2, shall read EXIT or shall use other appropriate wording in plainly legible letters sized as follows:

- (1) For new signs, the letters shall be not less than 6 in. (150 mm) high, with the principal strokes of letters not less than $\frac{3}{4}$ in. (19 mm) wide.
- (2) For existing signs, the required wording shall be permitted to be in plainly legible letters not less than 4 in. (100 mm) high.
- (3) The word EXIT shall be in letters of a width not less than 2 in. (51 mm), except the letter I, and the minimum spacing between letters shall be not less than $\frac{3}{8}$ in. (9.5 mm).
- (4) Sign legend elements larger than the minimum established in 7.10.6.1.1(1) through 7.10.6.1.1(3) shall use letter widths, strokes, and spacing in proportion to their height.

7.10.6.1.2 The requirements of 7.10.6.1.1 shall not apply to marking required by 7.10.1.3 and 7.10.1.6.

7.10.6.2* Size and Location of Directional Indicator.

7.10.6.2.1 Directional indicators, unless otherwise provided in 7.10.6.2.2, shall comply with the following:

- (1) The directional indicator shall be located outside of the EXIT legend, not less than $\frac{3}{8}$ in. (9.5 mm) from any letter.
- (2) The directional indicator shall be of a chevron type, as shown in Figure 7.10.6.2.1.
- (3) The directional indicator shall be identifiable as a directional indicator at a distance of 40 ft (12 m).
- (4) A directional indicator larger than the minimum established for compliance with 7.10.6.2.1(3) shall be proportionately increased in height, width, and stroke.
- (5) The directional indicator shall be located at the end of the sign for the direction indicated.



FIGURE 7.10.6.2.1 Chevron-Type Indicator.

7.10.6.2.2 The requirements of 7.10.6.2.1 shall not apply to approved existing signs.

7.10.6.3* Level of Illumination. Externally illuminated signs shall be illuminated by not less than 5 ft-candles (54 lux) at the illuminated surface and shall have a contrast ratio of not less than 0.5.

7.10.7 Internally Illuminated Signs.

7.10.7.1 Listing. Internally illuminated signs shall be listed in accordance with UL 924, *Standard for Emergency Lighting and Power Equipment*, unless they meet one of the following criteria:

- (1) They are approved existing signs.
- (2) They are existing signs having the required wording in legible letters not less than 4 in. (100 mm) high.
- (3) They are signs that are in accordance with 7.10.1.3 and 7.10.1.6.

7.10.7.2* Photoluminescent Signs. The face of a photoluminescent sign shall be continually illuminated while the building is occupied. The illumination levels on the face of the photoluminescent sign shall be in accordance with its listing. The charging illumination shall be a reliable light source as determined by the authority having jurisdiction. The charging light source shall be of a type specified in the product markings.

7.10.8 Special Signs.

7.10.8.1 Sign Illumination.

7.10.8.1.1 Where required by other provisions of this *Code*, special signs shall be illuminated in accordance with 7.10.5, 7.10.6.3, and 7.10.7.

7.10.8.1.2 Where emergency lighting facilities are required by the applicable provisions of Chapter 12 through Chapter 42, the required illumination of special signs shall additionally be provided under emergency lighting conditions.

7.10.8.2 Characters. Special signs, where required by other provisions of this *Code*, shall comply with the visual character requirements of ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*.

7.10.8.3* No Exit.

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

**NO
EXIT**

7.10.8.3.2 The NO EXIT sign shall have the word NO in letters 2 in. (51 mm) high, with a stroke width of $\frac{3}{8}$ in. (9.5 mm), and the word EXIT in letters 1 in. (25 mm) high, with the word EXIT below the word NO, unless such sign is an approved existing sign.

7.10.8.4 Elevator Signs. Elevators that are a part of a means of egress (*see 7.2.13.1*) shall have the following signs with a minimum letter height of $\frac{5}{8}$ in. (16 mm) posted in every elevator lobby:

- (1)* Signs that indicate that the elevator can be used for egress, including any restrictions on use
- (2)* Signs that indicate the operational status of elevators

7.10.9 Testing and Maintenance.

7.10.9.1 Inspection. Exit signs shall be visually inspected for operation of the illumination sources at intervals not to exceed 30 days or shall be periodically monitored in accordance with 7.9.3.1.3.

7.10.9.2 Testing. Exit signs connected to or provided with a battery-operated emergency illumination source, where required in 7.10.4, shall be tested and maintained in accordance with 7.9.3.

7.11 Special Provisions for Occupancies with High Hazard Contents.

See Section 6.2.

7.11.1* Where the contents are classified as high hazard, exits shall be provided and arranged to allow all occupants to escape from the building or structure, or from the hazardous area thereof, to the outside or to a place of safety with a travel distance of not more than 75 ft (23 m), measured as required in 7.6.1, unless otherwise provided in 7.11.2.

7.11.2 The requirement of 7.11.1 shall not apply to storage occupancies as otherwise provided in Chapter 42.

7.11.3 Egress capacity for high hazard contents areas shall be based on 0.7 in./person (18 mm/person) for stairs or 0.4 in./person (10 mm/person) for level components and ramps in accordance with 7.3.3.1.

7.11.4 Not less than two means of egress shall be provided from each building or hazardous area thereof, unless all of the following criteria are met:

- (1) Rooms or spaces do not exceed 200 ft² (18.6 m²).
- (2) Rooms or spaces have an occupant load not exceeding three persons.
- (3) Rooms or spaces have a travel distance to the room door not exceeding 25 ft (7620 mm).

7.11.5 Means of egress, for rooms or spaces other than those that meet the criteria of 7.11.4(1) through 7.11.4(3), shall be arranged so that there are no dead ends in corridors.

7.11.6 Doors serving high hazard contents areas with occupant loads in excess of five shall be permitted to be provided with a latch or lock only if the latch or lock is panic hardware or fire exit hardware complying with 7.2.1.7.

7.12 Mechanical Equipment Rooms, Boiler Rooms, and Furnace Rooms.

7.12.1 Mechanical equipment rooms, boiler rooms, furnace rooms, and similar spaces shall be arranged to limit common path of travel to a distance not exceeding 50 ft (15 m), unless otherwise permitted by the following:

- (1) A common path of travel not exceeding 100 ft (30 m) shall be permitted in the following locations:
 - (a) In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7

- (b) In mechanical equipment rooms with no fuel-fired equipment
 - (c) In existing buildings
- (2) In an existing building, a common path of travel not exceeding 150 ft (46 m) shall be permitted, provided that all of the following criteria are met:
- (a) The building is protected throughout by an approved, supervised automatic sprinkler system installed in accordance with Section 9.7.
 - (b) No fuel-fired equipment is within the space.
 - (c) The egress path is readily identifiable.
- (3) The requirement of 7.12.1 shall not apply to rooms or spaces in existing health care occupancies complying with the arrangement of means of egress provisions of 19.2.5 and the travel distance limits of 19.2.6.

7.12.2 Stories used exclusively for mechanical equipment, furnaces, or boilers shall be permitted to have a single means of egress where the travel distance to an exit on that story is not in excess of the common path of travel limitations of 7.12.1.