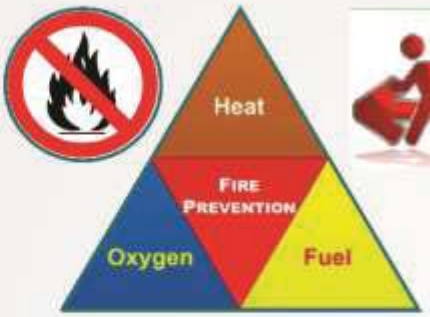
Government of Pakistan

Building Code of Pakistan
Fire Safety Provisions - 2016



Building Code of Pakistan - Fire Safety Provisions - 2016
(Based on NFPA 1 Fire Code - 2015)

Building Code of Pakistan Fire Safety Provisions - 2016

Chapter 10 Means of Egress

10.1 Application. Means of egress in new and existing buildings shall comply with these Provisions and referenced sections of NFPA 101 or any approved code/standard.

10.2 Definitions

10.2.1 Means of Egress. A continuous and unobstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge.

10.2.1.1 Exit Access. That portion of a means of egress, such as corridors, hallways, passageways, portions of intervening room, doors, elevators, balconies, lobbies and ramps, that leads to an exit.

10.2.1.2 Exit. That portion of a means of egress that is separated from all other spaces of a building or structure by construction, location, or equipment is required to provide a protected way of travel to the exit discharge.

10.2.1.3 Exit Discharge. That portion of a means of egress between the termination of an exit and a public way.

10.3 Separation of Means of Egress

10.3.1 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 not less than a 1-hour fire resistance rating in accordance with Section 8.6 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 relaxed in these Provisions for certain occupancies.

10.3.2 Exit Enclosure

10.3.2.1 Where these Provisions require an exit to be separated from other parts of the building, the separating construction shall meet the requirements of Section 8.6 and the following:

(1) The separation shall have a minimum 1-hour fire resistance rating where the exit connects three or fewer stories.

(2) The separation shall have a minimum 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 a minimum 1-hour fire resistance rating.

(b) In existing buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3, existing exit stair enclosures shall have a minimum 1-hour fire resistance rating.

(3) Openings in the separation shall be protected by fire door assemblies equipped with door closers.

(4) Penetrations into, and openings through, an exit enclosure assembly shall be limited to the following:

(a) Fire doors with self-closer.

(b) Electrical conduits serving the stairway.

(c) Required exit doors.

(d) Ductwork and equipment necessary for independent stair pressurization.

(e) Sprinkler piping.

(f) Standpipes.

(g) Existing penetrations protected in accordance with Section 8.6.5.

(h) Penetrations for fire alarm circuits, where the circuits are installed in metal conduit.

(5) Penetrations or communicating openings shall be prohibited between adjacent exit enclosures.

(6) Membrane penetrations shall be permitted on the exit access side of the exit enclosure and shall be protected.

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

10.3.2.3 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.

10.4 Interior Wall, Ceiling and Floor Finish in Exit Enclosures

10.4.1 In exit enclosures, interior wall and ceiling finish materials complying with Section 8.4.4 shall be Class A or Class B.

10.4.2 New interior floor finish in exit enclosures, including stair treads and risers, shall be not less than Class II in accordance with Section 8.4.4.

10.4.3 Existing interior floor finish in exit enclosures, including stair treads and risers, shall be permitted to remain in use unless it presents a severe fire hazard.

10.5 Headroom

10.5.1 Means of egress shall be designed and maintained to provide headroom not less than 7 ft 6 in. (2285 mm), with projections from the ceiling not less than 6 ft 8 in. (2030 mm) above the finished floor.

10.5.2 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.

10.5.3 Measurement of headroom clearance shall be in accordance with Figure 10.5.3.

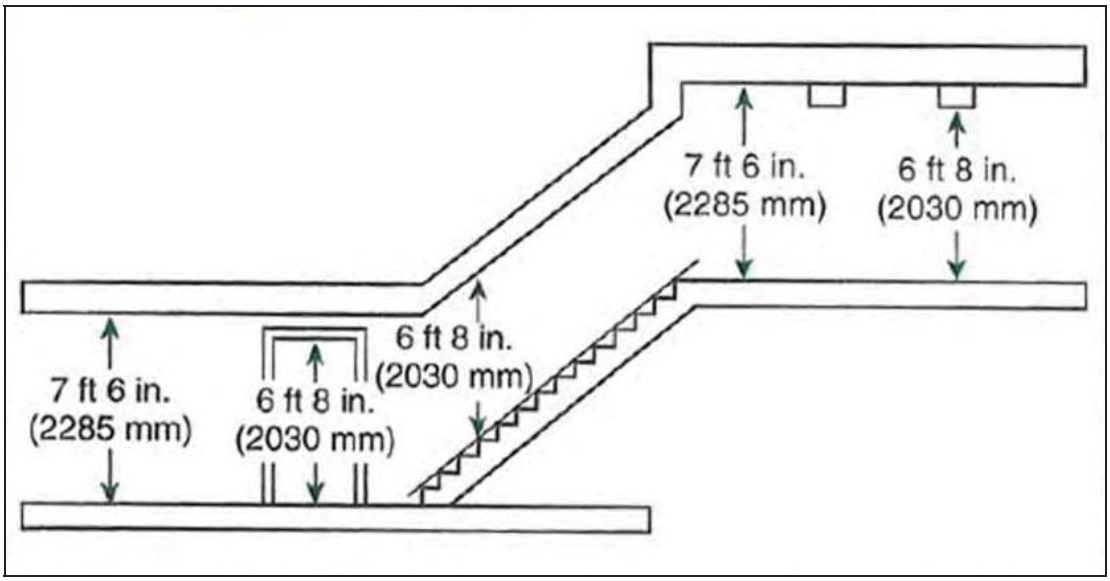


Figure 10.5.3 Measurement of Headroom Clearance (Source: UAE Fire and Life Safety Code of Practice)

10.6 Walking Surfaces in the Means of Egress

10.6.1 Approved existing walking surfaces shall be permitted.

10.6.2 Changes in Elevation

10.6.2.1 Abrupt changes in elevation of walking surfaces shall not exceed 1⁄4 in. (6.3 mm). Changes in elevation exceeding 1⁄4 in. (6.3 mm), but not exceeding 1⁄2 in. (13 mm), shall be beveled with a slope of 1 in 2.

10.6.2.2 Changes in elevation exceeding 1⁄2 in. (13 mm), shall be achieved with a ramp or stair.

10.6.3 Level. Walking surfaces shall comply with all of the following:

(1) The slope of a walking surface in the direction of travel shall not exceed 1 in 20.

(2) The slope perpendicular to the direction of travel shall not exceed 1 in 48.

10.7 Impediments to Egress

10.7.1 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.

10.8 Means of Egress Reliability

10.8.1 Maintenance. 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.

10.8.2 Furnishings and Decorations in Means of Egress

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

10.8.2.2 No obstruction by railings, barriers, or gates shall divide the means of egress into sections appurtenant to individual rooms, apartments, or other occupied spaces.

10.8.2.2 Mirrors shall not be placed on exit door leaves.

10.9 Means of Egress Components

10.9.1 Door Openings

10.9.1.1 General. Section 7.2.1 of NFPA 101 or any approved code/standard shall be followed.

10.9.1.1.1 Every door opening 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 door openings shall be made inaccessible to the occupants by barriers or railings.

10.9.1.2 Occupied Building. For the purposes of this Chapter, a building shall be considered to be occupied at any time if meets any of the following criteria:

(1) It is open for general occupancy

(2) It is open to the public

(3) It is occupied by more than 10 persons

10.9.1.3 Where means of egress doors are locked in a building that is not considered occupied, occupants shall not be locked beyond their control in buildings or building spaces, except for lockups in detention and correctional occupancies, and health care occupancies.

10.9.1.4 Door Leaf Width

10.9.1.4.1 Measurement of Clear Door Width. It shall be measured as follows.

(1) The measurement shall be taken at the narrowest point in the door opening

(2) For all doors, the measurement shall be taken with the door leaf in the fully open position.

(3) For new swinging doors assemblies, the measurement shall be taken with the door leaf open 90 degrees

(4) Projections of not more than 4 in. (100 mm) into the door opening width on the hinge side shall not be considered reductions in clear 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), and not more than 48 in. (1220 mm), above the floor

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

10.9.1.4.2 Minimum Door Leaf Width. Door openings in means of egress shall be not less than 32 in. (810 mm) in clear width. Where a pair of doors is provided, not less than one of the doors shall provide not less than 32 in. (810 mm) clear width opening.

10.9.1.5 Swing and Force to Open

10.9.1.5.1 Swinging-Type Door Assembly Requirement. Any door assembly 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.

10.9.1.5.2 Door leaves required to be of the side-hinged or pivoted-swinging type shall swing in the direction of egress travel.

10.9.1.5.3 In existing occupancies and where permitted elsewhere in these Provisions, horizontal-sliding or vertical-rolling security grilles or door assemblies that are part of the

required means of egress shall be permitted, provided that all of the following criteria are met:

(a) Such grilles or door assemblies shall remain secured in the fully open position during the period of occupancy by the general public.

(b) On or adjacent to the grill or door opening, there shall be a readily visible, that reads as follows:

THIS DOOR TO REMAIN OPEN WHEN THE SPACE IS OCCUPIED

(c) Door assembly is readily operable from either side without special knowledge or effort.

10.9.1.5.4 Horizontal-sliding doors are permitted in private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10 persons contain only low or ordinary hazard contents, door openings to such areas and private garages shall be permitted to be horizontal-sliding door assemblies.

10.9.1.5.5 In private garages, business areas, industrial areas, and storage areas with an occupant load not exceeding 10 persons contain only low or ordinary hazard contents, door openings to such areas and private garages shall be permitted to be vertical-rolling door assemblies.

10.9.1.5.6 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.

10.9.1.6 Door Leaf Encroachment. During its swing, any door leaf 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.

10.9.1.7 Door Leaf Operating Forces. Door leaf shall be such that these can be easily opened by all occupants.

10.9.1.8 Locks, Latches, and Alarm Devices

10.9.1.8.1 Door leaves shall be arranged to be opened readily from the egress side whenever the building is occupied.

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

10.9.1.8.3 Exterior door assemblies shall be permitted to have key-operated locks from the egress side, provided that all of the following criteria are met:

(2) A readily visible sign 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.

10.9.1.8.4 Electrically Controlled Egress Door Assemblies. Door assemblies in the means of egress shall be permitted to be electrically locked, provided that all of the following conditions are met:

(1) The hardware for occupant release of the lock is affixed to the door leaf.

(2) The hardware has an obvious method of operation that is readily operated in the direction of egress.

(3) The hardware is capable of being operated with one hand in the direction of egress.

(4) Operation of the hardware interrupts the power supply directly to the electric lock and unlocks the door assembly in the direction of egress.

(5) Loss of power to the hardware automatically unlocks the door assembly in the direction of egress.

10.9.1.8.5 Every door assembly in a stair enclosure serving more than four stories, shall meet one of the following conditions:

(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 door assemblies to allow re-entry (see Figure 10.9.1.8.5).

10.9.1.8.6 Door assemblies 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) Door assemblies allowing re-entry shall be identified as such on the stair side of the door leaf.

(5) Door assemblies not allowing re-entry shall be provided with a sign on the stair side indicating the location of the nearest door opening, in each direction of travel, that allows re-entry or exit.

10.9.1.8.7 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.

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

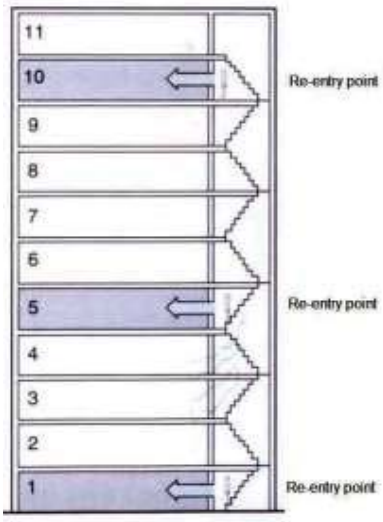


Figure 10.9.1.8.5. Re-entry Point (Source: UAE Fire and Life Safety Code of Practice)

10.9.1.8.9 Access-Controlled Egress Door Assemblies. Door assemblies in the means of egress shall be permitted to be equipped with an approved entrance and egress access control system, provided that all of the following criteria are met:

(1) A sensor shall be provided on the egress side, arranged to unlock the door leaf in the direction of egress upon detection of an approaching occupant.

(2) Door leaves shall automatically unlock in the direction of egress upon loss of power to the sensor.

(3) Door locks shall be arranged to unlock in the direction of egress from a manual release device, located on the egress side, 40 in. to 48 in. (1015 mm to 1220 mm) vertically above the floor, and within 60 in. (1525 mm) of the secured door openings.

(4) The manual release device shall be readily accessible and clearly identified by a sign that reads: PUSH TO EXIT.

(5) Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically unlock the door leaves in the direction of egress, and the door leaves shall remain unlocked until the fire-protective signaling system has been manually reset.

10.9.1.8.10 Elevator Lobby Exit Access Door Assemblies Locking. Door assemblies separating the elevator lobby from the exit access shall be permitted to be electronically locked, provided that all the following criteria are met:

(1) The building is protected throughout by a fire alarm system in accordance with Section 9.7.

(2) The building is protected throughout by an approved supervised automatic sprinkler system in accordance with Section 9.3.

(3) The elevator lobby is protected by an approved, supervised smoke detection system in accordance with Section 9.7.

(4) Detection of smoke by the detection system required is arranged to initiate the building fire alarm system and notify building occupants.

(5) Loss of power to the elevator lobby electronic lock system unlocks the elevator lobby door assemblies.

(6) Once unlocked, the elevator lobby door assemblies remain unlocked until the building fire alarm system has been manually reset.

10.9.1.8.11 Panic Hardware and Fire Exit Hardware

10.9.1.8.11.1 Where a door assembly is required to be equipped with panic or fire exit hardware, such hardware 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.

10.9.1.8.11.2 Required panic hardware and fire exit hardware, in other than detention and correctional occupancies, 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.

10.9.1.8.12 Self-Closing Devices

10.9.1.8.12.1 A door leaf 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.

10.9.1.8.12.2 A door shall be permitted to be automatic-closing, provided that all of the following criteria are met:

(1) Upon release of the hold-open mechanism, the leaf becomes self-closing.

(2) The release device is designed so that the leaf instantly releases manually and, upon release, becomes self-closing.

(3) The automatic releasing mechanism or medium is activated by the operation of approved smoke detectors.

(4) Upon loss of power to the hold-open device, the hold open mechanism is released and the door leaf becomes self-closing.

10.9.1.8.13 Fire Rating Requirements for Doors. Fire rating of doors shall be as follows based on location and occupancies in Table 10.9.1.8.13.

Table 10.9.1.8.13 Fire Rating Requirements for Doors at Various Locations (Source: UAE Fire and Life Safety Code of Practice)

OCCUPANCY	LOCATION	DOOR FIRE RATING	SMOKE PROOF	SELF CLOSING	LATCHES
All Occupancies	Exit Stairs	90 Minutes	Yes	Yes	Not Allowed
All Occupancies	Exit Discharge	90 Minutes	Yes	Yes	Not Allowed
All Occupancies	Exit Corridor	60 Minutes	Yes	No	Not Allowed
All Occupancies	Service Corridor	60 Minutes	No	No	Allowed
All Occupancies	Service Rooms	60 Minutes	No	No	Allowed
All Occupancies	Access Panel	60 Minutes	No	No	Allowed
All Occupancies	Elevator Lobby	60 Minutes	Yes	Yes	Not Allowed
All Occupancies	Horizontal Exits	90 Minutes	Yes	Yes	Not Allowed
Labor Accommodation	Room Door	30 Minutes	No	No	Allowed
Residential Flats	Main Flat Door	60 Minutes	No	No	Allowed
Hotels	Main Room Door	60 Minutes	No	No	Allowed
Office	Main Entrance	60 Minutes	Yes	Yes	Allowed

10.9.2 Elevator Landing and Lobby Exit Access

10.9.2.1 Each elevator landing and lobby shall have access to at least one exit.

10.9.2.2 The elevator landing and lobby exit access shall not require the use of a key, a tool, special knowledge, or special effort.

10.9.2.3 Doors separating the elevator lobby from the exit access shall be permitted to be electronically locked.

10.9.3 Exit Passageways

10.9.3.1 Exit corridors and passageways shall be of width not less than the aggregate required width of exit doorways leading from them in the direction of travel to the exterior.

10.9.3.2 Where stairways discharge through corridors and passageways, the height of corridors and passageways shall be not less than 2.4 m (8 ft).

10.9.3.3 All means of exit including staircases, lifts, lobbies and corridors shall be adequately ventilated.

10.9.3.4 Enclosure. An exit passageway shall be separated from other parts of the building as specified in Section 10.3

10.9.3.5 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.

10.9.3.6 Width. The width of an exit passageway shall be sized to accommodate the aggregate required capacity of all exits that discharge through it.

10.10 Capacity of Means of Egress

10.10.1 The total capacity of the means of egress for any story, balcony, tier, or other occupied space shall be sufficient for the occupant load determined in accordance with Section 10.10.2.

10.10.2 Occupant Load

10.10.2.1 The occupant load in any building or portion thereof shall be not less than the number of persons determined by dividing the floor area by the occupant load factor specified in Table 10.10.2.1.

Table 10.10.2.1 Occupant Load Factor

Use	(ft^2 per person)	(m^2 per person)
Assembly Use		
Concentrated use, without fixed seating	7	0.65
Less concentrated use, without fixed seating	15	1.4
Bench-type seating	1 person/18 linear inch	1 person/455 linear mm
Fixed seating	Use number of fixed seats	Use number of fixed seats
Waiting spaces	7	0.65
Kitchens	100	9.3
Library stack areas	100	9.3
Library reading rooms	50	4.6
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	1.4
Lighting and access catwalks, galleries, gridirons	100	9.3
Gaming areas	11	1
Skating rinks	50	4.6
Business Use (other than below)	100	9.3
Concentrated Business Use	50	4.6
Air traffic control tower observation levels	40	3.7
Day-Care Use	35	3.3
Detention and Correctional Use	120	11.1
Educational Use		
Classrooms	20	1.9
Shops, laboratories, vocational rooms	50	4.6
Health Care Use		
Inpatient treatment departments	240	22.3
Sleeping departments	120	11.1
Outpatient health care	150	13
Industrial Use		
General and high hazard industrial	100	9.3
Special-purpose industrial	NA	NA
Mercantile Use		
Sales area on street floor	30	2.8
Sales area on two or more street floor	40	3.7
Sales area on floor below street floor	30	2.8
Sales area on floors above street floor	60	5.6

Floors or portions of floors used only for offices	See business use	See business use.
Floors or portions of floors used only for storage, receiving, and shipping, and not open to general public	300	27.9
Mall buildings	Per factors applicable to use of space	
Residential Use		
Hotels and dormitories	200	18.6
Apartment buildings	200	18.6
Board and care, large	200	18.6
Storage Use		
In storage occupancies	NA	NA
In mercantile occupancies	300	27.9
In other than storage and mercantile occupancies	500	46.5

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

10.10.2.2 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.

10.10.2.3 Egress 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 required capacity of the two means of egress.

10.10.2.4 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 in which it is located.

10.10.2.5 Egress Capacity for Corridor

10.10.2.5.1 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.

10.10.2.5.2 The clear width of any corridor or passageway serving an occupant load of 50 or more shall be not less than 1200 mm.

10.10.2.6 Egress Capacity for single exit access. 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.

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

10.10.2.8 Egress Capacity for street floor exit. Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging through the street floor.

10.10.3 For other than existing means of egress, where more than one means of egress is required, the means of egress shall be of such width and capacity that the loss of anyone means of egress leaves available not less than 50 percent of the required capacity.

10.10.4 Egress Capacity

10.10.4.1 Egress capacity shall be based on the capacity factors shown in Table 10.10.4.1.

Table 10.10.4.1 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

10.10.5 Measurement of Width of Means of Egress

10.10.5.1 The width of means of egress shall be measured at the narrowest point of the egress component under consideration.

10.10.5.2 Projections within the means of egress of not more than 4.5 in. (114 mm) on each side shall be permitted at a height of 38 in. (965 mm) and below. In the case of stair and landing handrails forming part of a guard, such projections shall be permitted at a height of 42 in. (1065 mm) and below.

10.10.5.3 Minimum Width

10.10.5.3.1 The width of any means of egress, shall not be less than 36 in. (915 mm) where another part of this chapter does not specify a minimum width.

10.10.5.3.2 The width of exit access serving not more than six people, and having a length not exceeding 50 ft (15 m) shall be not less than 28 in. (455 mm).

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

10.11 Number of Means of Egress

10.11.1 The number of means of egress shall be sufficient to accommodate the occupant load determined in accordance with Table 10.10.2.1 and complying with the travel distance requirements given in Table 10.11.1.

10.11.2 In new and existing occupancies**, t**he number of means of egress from any balcony, mezzanine, story, or portion thereof shall be not less than two.

10.11.3 In new occupancies, the number of means of egress from any story or portion thereof, 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

10.11.1.3 Accessible means of egress that do not utilize elevators shall be permitted to serve as any or all of the required minimum number of means of egress.

10.11.1.3 A single means of egress shall be permitted from a mezzanine, provided that the common path of travel does not exceed 23 m in case of non-sprinklered buildings and 30 m in case of sprinklered buildings.

10.11.1.4 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.

Table 10.11.1 Travel distance for occupancy and type of construction

S.No	Group of Occupancy	Maximum Travel Distance Construction	
		Types 1 and 2 (m)	Types 3 and 4 (m)
1	**2**	**3**	**4**
i)	Residential (A)	30.0	22.5
ii)	Educational (B)	30.0	22.5
iii)	Institutional (C)	30.0	22.5
iv)	Assembly (D)	30.0	30.0
v)	Business (E)	30.0	30.0
vi)	Mercantile (G)	30.0	30.0
vii)	Industrial (H)	45.0	Not permitted
viii)	Storage (J)	30.0	Not permitted
ix)	Hazardous (H)	22.0	Not permitted

Note: For fully sprinkled building, the travel distance may be increased by 50 percent of the values specified. Ramps shall be protected with automatic sprinkler system and shall be counted as one of the mean of escape.

10.11.1.3 Accessible means of egress that do not utilize elevators shall be permitted to serve as any or all of the required minimum number of means of egress.

10.11.1.4 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.

10.11.1.5 Elevator Landing and Lobby Exit Access. Each elevator landing and lobby shall have access to at least one exit.

10.12 Arrangement of Means of Egress

10.12.1 General

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

10.12.1.2 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.

10.12.1.3 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 hazardous area.

14.12.1.4 Exit access corridors shall provide access to not less than two exits.

10.12.1.5 Exit access shall be arranged so that there are no dead ends in corridors.

10.12.1.6 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 permitted by AHJ due to practical difficulties.

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

10.12.2 Travel Distance to Exits

10.12.2.1 Exits shall be so located that the travel distance on the floor shall not exceed the distance given in Table 10.11.1.

10.12.2.2 The travel distance to an exit from the dead end of a corridor shall not exceed half the distance specified in Table 10.11.1, except in assembly occupancies in which case it shall not exceed 6 m (20 ft).

10.12.3 Interlocking or scissor stairs

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

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

(1) They are separated from each other by 2-hour fire resistance–rated noncombustible construction.

(2) No protected or unprotected penetrations or communicating openings exist between the stair enclosures.

10.12.4 Remoteness of Exits

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

10.12.4.2 Where two exits, exit accesses, or exit discharges 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 exits, exit accesses, or exit discharges.

10.12.4.3 In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.3, the minimum separation distance between two exits, exit accesses, or exit discharges, measured in accordance with Section 10.10.1.9.2, shall be not less than one-third the length of the maximum overall diagonal dimension of the building or area to be served.

10.12.4.4 In existing buildings, where more than one exit, exit access, or exit discharge is required, such exits, exit accesses, or exit discharges shall be exempt from the diagonal measurement separation distance criteria of Sections 10.10.4.2 and 10.10.4.3.

10.12.4.5 In other than existing buildings, where more than two exits, exit accesses, or exit discharges are required, at least two of the required exits, exit accesses, or exit discharges shall be arranged to comply with the minimum separation distance requirement.

10.12.4.6 The balance of the exits, exit accesses, or exit discharges shall be located so that, if one becomes blocked, the others are available.

10.12.5 Impediments to Egress

10.12.5.1 Access to an exit shall not be through kitchens, store rooms, restrooms, closets, bedrooms or similar spaces, or other rooms or spaces subject to locking, unless passage through such rooms or spaces is permitted for any occupancy elsewhere in these Provisions.

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

10.12.5.3 Hangings, curtains or draperies shall not be placed over exit doors or located so that they conceal or obscure any exit.

14.12.5.4 Curtains shall be permitted across means of egress openings in tent walls, provided that all of 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.

10.13 Discharge from Exits

10.13.1 Exit Termination. Exits shall terminate directly, at public way or at an exterior exit discharge.

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

10.13.1.2 The requirement of Section 10.13.1.1 shall not apply to interior exit discharge and to roof top exit discharge.

10.13.1.3 Means of egress shall be permitted to terminate in an exterior area of refuge for detention and correctional occupancies.

10.13.2 Exit shall be permitted to discharge to roofs or other sections of the building or an adjoining building where all of the following criteria are met:

(1) The roof/ceiling assembly 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.

10.13.3 Exit Discharge Through Interior Building Areas. Exits shall be permitted to discharge through interior building areas, provided that all of the following are met:

(1) Not more than 50 percent of the required number of exit stairs serving normally occupied areas of each floor, and not more than 50 percent of the exit stair capacity required for normally occupied areas of each floor, shall discharge through areas on any level of discharge.

(2) Each level of discharge shall discharge directly outside at the finished ground level or discharge directly outside and provide access to the finished ground level by outside stairs or outside ramps.

(3) The interior exit discharge 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.

10.13.4 Arrangement and Marking of Exit Discharge. Doors, stairs, ramps, corridors, exit passageways, bridges, balconies, escalators, moving walks, and other components of an exit discharge shall be conspicuously marked and travel directions shall be clearly indicated.

10.14 Illumination of Means of Egress

10.14.1 Emergency and Escape Lighting

10.14.1.1 Emergency lighting shall be powered from a source independent of that supplying the normal lighting.

10.14.1.2 Escape lighting shall be capable of:

(1) Indicating clearly and unambiguously the escape routes

(2) Providing adequate illumination along such routes to allow safe movement of persons towards and through the exits

(3) Ensuring that fire alarm call points and fire fighting equipment provided along the escape routes can be readily located

10.14.1.3 The horizontal luminance at floor level on the centreline of an escape route shall be not less than 10 lux. In addition, for escape routes up to 2 m (6.5 ft) wide, 50 percent of the route width shall be lit to a minimum of 5 lux.

10.14.1.4 The emergency lighting shall be provided to be put on within 1s of the failure of the normal lighting supply.

10.14.1.5 Escape lighting luminaries should be sited to cover the following locations

(1) Near each intersection of corridors

(2) At each exit door

(3) Near each change of direction in the escape route. Near shall be considered to be within 2 m (6.5 ft) measured horizontally.

(4) Near each staircase so that each flight of stairs receives direct light

(5) Near any other change of floor level

(6) Outside each final exit and close to it

(7) Near each fire alarm call point

(8) Near fire-fighting equipment

(9) To illuminate exit and safety signs as required by the enforcing authority

10.14.1.6 Emergency lighting systems shall be designed to ensure that a fault or failure in any one luminaire does not reduce the effectiveness of the system.

10.14.1.7 The luminaires shall be mounted as low as possible, but at least 2 m (6.5 ft) above the floor level.

10.14.1.8 Signs are required at all exits, emergency exits and escape routes, which shall comply with the graphic requirements of the relevant standards.

10.14.1.9 Emergency lighting luminaires and their fittings shall be of non-flammable type.

10.14.1.10 Wiring and installation of the emergency lighting systems shall be of high quality so as to ensure their perfect serviceability at all times.

10.14.1.11 Emergency lighting system shall be capable of continuous operation for a minimum duration of 1 h and 30 minutes.

10.14.1.12 Emergency lighting system shall be maintained by periodical inspections and tests so as to ensure their perfect serviceability at all times.

10.14.2 Illumination of Means of Exit

10.14.2.1 The staircase and corridor lighting shall be on separate circuits and shall be independently connected so that it could be operated by one switch installation on the ground

floor easily accessible to fire fighting staff at any time irrespective of the position of the individual control of the light points, if any. It shall be of miniature circuit breaker type of switch so as to avoid replacement of fuse in case of crisis.

10.14.2.2 Staircase and corridor lighting shall also be connected to alternative supply. The alternative source of supply shall be provided by battery continuously trickle charged from the electric mains.

10.14.2.3 Suitable arrangements shall be made by installing double throw switches to ensure that the lighting installed in the staircase and the corridor does not get connected to two sources of supply simultaneously. Double throw switch shall be installed in the service room for terminating the stand-by supply.

10.14.2.4 Power Source. Where emergency lighting facilities are required for individual occupancies, the signs, other than approved self-luminous signs and listed/approved/approved photo luminescent signs shall be illuminated by the emergency lighting facilities.

10.14.2.5 Periodic Testing of Emergency Lighting Equipment

10.14.2.5.1 Emergency lighting systems shall be tested as follows:

(1) Functional testing shall be conducted monthly with a minimum of 3 weeks and a maximum of 5 weeks between tests, for not less than 30 seconds.

(2) Functional testing shall be conducted annually for a minimum of 1.5 hours if the emergency lighting system is battery powered.

(3) Written records of visual inspections and tests shall be kept by the owner for inspection by AHJ.

10.15 Marking of Means of Egress

10.15.1 Exits

10.15.1.1 Exits, shall be marked by an approved sign that is readily visible from any direction of exit access.

10.15.1.2 Horizontal components of the egress path within an exit enclosure shall be marked by approved exit or directional exit signs where the continuation of the egress path is not obvious.

10.15.1.3 Exit Stair Door Signage. Signage shall be provided to meet the following criteria:

(1) Signage shall be located at each exit door requiring an exit sign.

(2) Signage shall read as follows: EXIT

(3) Signage shall comply with any of the code/standard acceptable to AHJ.

10.15.2 Exit Access

10.15.2.1 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.

10.15.2.2 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.

10.15.3 Directional exit signs shall be provided within horizontal components of the egress path within exit enclosures

10.15.4 No Exit

10.15.4.1 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**

10.16 Internal Staircases

10.16.1 Internal stairs shall be constructed of non-combustible materials throughout.

10.16.2 Internal stairs shall be constructed as a self-contained unit with an external wall of the building constituting at least one of its sides and shall be completely enclosed.

10.16.3 A staircase shall not be arranged round a lift shaft.

10.16.4 No gas piping or electrical panels shall be allowed in the stairway. Ducting in stairway shall be permitted if it is of 1 h fire resistance rating.

10.16.5 Following minimum width shall be provided for staircases, provided it is not less than minimum width specified for these occupancies elsewhere in these Provisions.

(1) Residential buildings (one to two family dwellings)	1.0 m (3.25 ft)
(2) Residential buildings (hotels and dormitories)	1.5 m (4.9 ft)
(3) Assembly buildings (like auditorium, theatres and cinemas)	2.0 m (6.5 ft)
(4) Educational buildings up to 30 m (98 ft) in height	1.5 m (4.9 ft)
(5) Health care occupancies	2.0 m (6.5 ft)
(6) All other buildings	1.5 m (4.9 ft)

10.16.6 The minimum width of tread without nosing shall be 250 mm for internal staircase of residential buildings. This shall be 300 mm (12 in.) for assembly, hotels, educational, business and other buildings.

10.16.7 The treads shall be constructed and maintained in a manner to prevent slipping.

10.16.8 The maximum height of riser shall be 190 mm (7.5 in.) for residential buildings and 150 mm (6 in.) for other buildings and the number shall be limited to 15 per flight.

10.16.9 Handrails shall be provided at a height of 1 m (3.25 ft) to be measured from the base of the middle of the treads to the top of the handrails.

10.16.10 Number of people in between floor landings in staircase shall not be less than the population on each floor for the purpose of design of staircase. The design of staircase shall also take into account the following

(1) No living space, store or other fire risk shall open directly into the staircase or staircases.

(2) External exit door of staircase enclosure at ground level shall open directly to the open spaces or through a large lobby, if necessary.

(3) The main and external staircases shall be continuous from ground floor to the terrace level.

(4) No electrical shafts, A/C ducts or gas pipes, etc. shall pass through or open in the staircases. (5) Lifts shall not open in staircase.

(6) No combustible material shall be used for decoration and wall panelling in the staircase.

(7) Beams, columns and other building features shall not reduce the head room and width of the staircase.

(8) The exit sign with arrow indicating the way to the escape route shall be provided at a suitable height from the floor level on the wall and shall be illuminated by electric light connected to corridor circuits.

(9) All exit way marking signs shall be flush with the wall and so designed that no mechanical damage shall occur to them due to moving of furniture or other heavy equipment.

(10) All landings of floor shall have floor indicating boards prominently indicating the number of floor. The floor indication board shall be placed on the wall immediately facing the flight of stairs and nearest to the landing. It shall be of size not less than 0.5×0.5 m (20x20 in.).

(11) Individual floors shall be prominently indicated on the wall facing the staircases.

(12) In case of single staircase, it shall terminate at the ground floor level and the access to the basement shall be by a separate staircase. The second staircase may lead to basement levels provided the same is separate at ground level by ventilated lobby with discharge points to two different ends through enclosures.

10.17 Pressurization of Staircases (Protected Escape Routes)

10.17.1 The pressurization of staircases shall be adopted for high rise buildings and building having mixed occupancy or multiplexes having covered area more than 500 m^2 (5380 ft^2).

10.17.2 The pressure difference for staircases shall be as under:

Box: A	Pressure Difference	
Building Height	Reduce Operation (Stage 1 of a 2-Stage System (Pa)	Emergency Operation (Stage 2 of a 2-Stage or Single Stage System) (Pa)
Less than 15 m (49 ft)	8	50
15 m (46 ft) or above	15	50

10.17.3 The difference in pressurization levels between staircase and lobbies (or corridors) shall not be greater than 5 Pa (0.1 psf).

10.17.4 Pressurization system shall be of two types:

(1) Single-stage, designed for operation only in the event of an emergency; and

(2) Two-stage, where normally a level of pressurization is maintained in the protected escape routes and an increased level of pressurization can be brought into operation in an emergency.

10.17.5 The normal air-conditioning system and the pressurization system shall be treated as an integral one, especially for a two-stage system. When the emergency pressurization is brought into action, the following changes in the normal air-conditioning system shall be effected

(1) Any re-circulation of air shall be stopped and all exhaust air vented to atmosphere.

(2) Any air supply to the spaces/areas other than escape routes shall be stopped.

(3) The exhaust system shall be continued provided

(a) The positions of the extraction grills permit a general air flow away from the protected escape route entry

(b) The construction of the ductwork and fans is such that, it will not be rendered inoperable by hot gases and smoke

(3) There is no danger of spread of smoke to other floors by the path of the extraction system which can be ensured by keeping the extraction fans running

10.17.6 The pressurization system shall be interconnected with the fire alarm system for actuation.

10.18 External Stairs

10.18.1 An external staircase shall be provided for high rise buildings.

10.18.2 External stairs shall always be kept in sound operable conditions.

10.18.3 All external stairs shall be directly connected to the ground.

10.18.4 Entrance to the external stairs shall be separate and remote from the internal staircase.

10.18.5 Care shall be taken to ensure that no wall opening or window opens on to or close to an external stairs.

10.18.6 The route to the external stairs shall be free of obstructions at all times.

10.18.7 The external stairs shall be constructed of non-combustible materials, and any doorway leading to it shall have the required fire resistance.

10.18.8 No external staircase, used as a fire escape, shall be inclined at an angle greater than 45° from the horizontal.

10.18.9 External stairs shall have straight flight not less than 1.25 m (4.10 ft) wide with 250 mm (10 in.) treads and risers not more than 190 mm (7.5 in.). The number of risers shall be limited to 15 per flight.

10.18.10 Handrails shall be of a height not less than 1 m (3.25 ft) and not exceeding 1.2 m (4 ft).

10.18.11 The use of spiral staircase shall be limited to a building not exceeding 9 m (29.5 ft) in height. A spiral stair case shall be not less than 1.5 m (5 ft) in diameter and shall be designed to give adequate headroom.

10.18.12 Unprotected steel frame staircase shall not be accepted as means of egress.

10.18.13 Steel staircase in an enclosed fire rated compartment of 2 h shall be accepted as means of escape.

10.19 Horizontal Exits

10.19.1 The width of horizontal exit shall be same as for the exit doorways.

10.19.2 A horizontal exit shall be equipped with at least one fire/smoke door of minimum 1 h fire resistance, of self-closing type.

10.19.3 For buildings more than 30 m (100 ft) in height, refuge area of 15 m^2 (161 ft^2) or an area equivalent to 0.3 m^2 (3.2 ft^2) per person to accommodate the occupants of two consecutive floors, whichever is higher.

10.19.4 The refuge area shall be provided on the periphery of the floor or on a cantilever projection and open to air at least on one side protected with suitable railings.

(1) For floors above 30 m (100 ft) and up to 45 m (150 ft): one refuge area on the floor immediately above 30 m (100 ft)

(2) For floors above 45 m (150 ft): one refuge area on the floor immediately above 45 m (150 ft) and so on after every 15 m (49 ft).

10.19.5 Residential flats in multi-storied building with balcony, shall not be provided with refuge area, however flats without balcony shall provide refuge area as given above.

10.19.6 Where there is a difference in level between connected areas for horizontal exits, ramps, not more than 1 in 10 m (32.8 ft) slope shall be provided; steps shall not be used.

10.19.7 Doors in horizontal exits shall be open-able at all times from both sides.

10.20 Fire Tower

10.20.1 Fire towers are the preferred type of escape route for storied buildings and these shall be considered as the safest route for escape. Their number, location and size shall depend on the building concerned, and its associated escape routes.

10.20.2 In high rise buildings with over 30 m (100 ft) in height, at least one required means of egress shall be a fire tower.

10.20.3 The fire towers shall be constructed of walls with a 2 h fire resistance rating without openings other than the exit doorways, with platforms, landings and balconies having the same fire-resistance rating.

10.21 Ramps

10.21.1 Ramps shall comply with all the applicable requirements for stairways regarding enclosure, capacity and limiting dimensions.

10.21.2 The slope of a ramp shall not exceed 1 in 10.

10.21.3 For all slopes exceeding 1 in 10 and wherever the use is such as to involve danger of slipping, the ramp shall be surfaced with approved non-slipping material.

10.22 Fire Lifts

10.22.1 Where applicable, fire lifts shall be provided with a minimum capacity for 8 passengers and fully automated with emergency switch on ground level.

10.22.2 Buildings 30 m (100 ft) in height or above shall be provided with fire lifts.

10.22.3 In case of fire, only fireman shall operate the fire lift.

10.22.3 Each fire lift shall be equipped with suitable inter-communication equipment for communicating with the control room on the ground floor of the building.

10.22.4 The number and location of fire lifts in a building shall be decided after taking into consideration various factors like building population, floor area, compartmentation, etc.