

CONST-181

Building Code Interpretation:

Non-Structural

Class 9: Chapter 10, Sections 1001 through 1005, 1008, 1009, 1013 and 1015

Source: 2021 IBC

Chapter Overview

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Exit Access

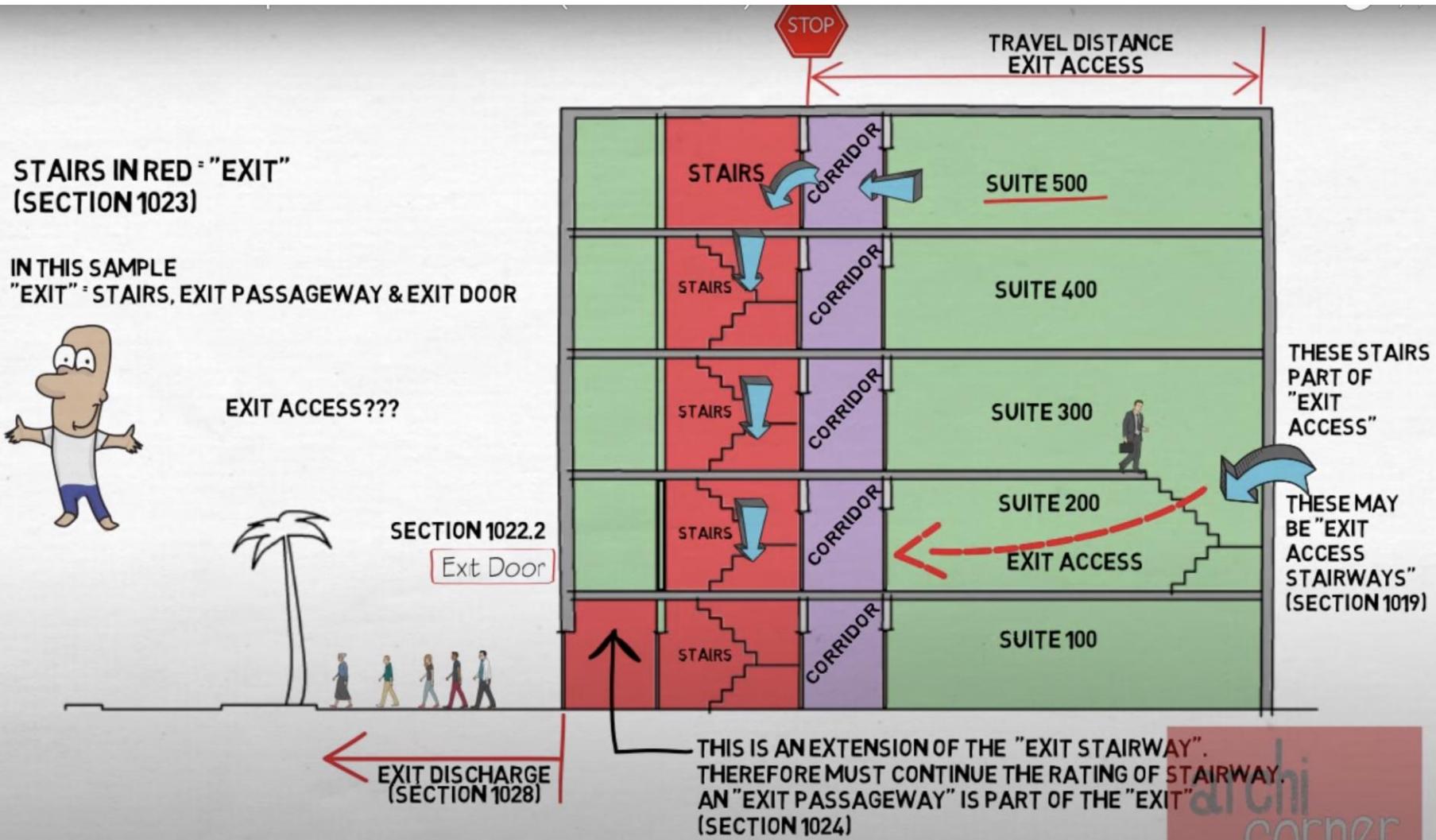
Exit

Exit Discharge

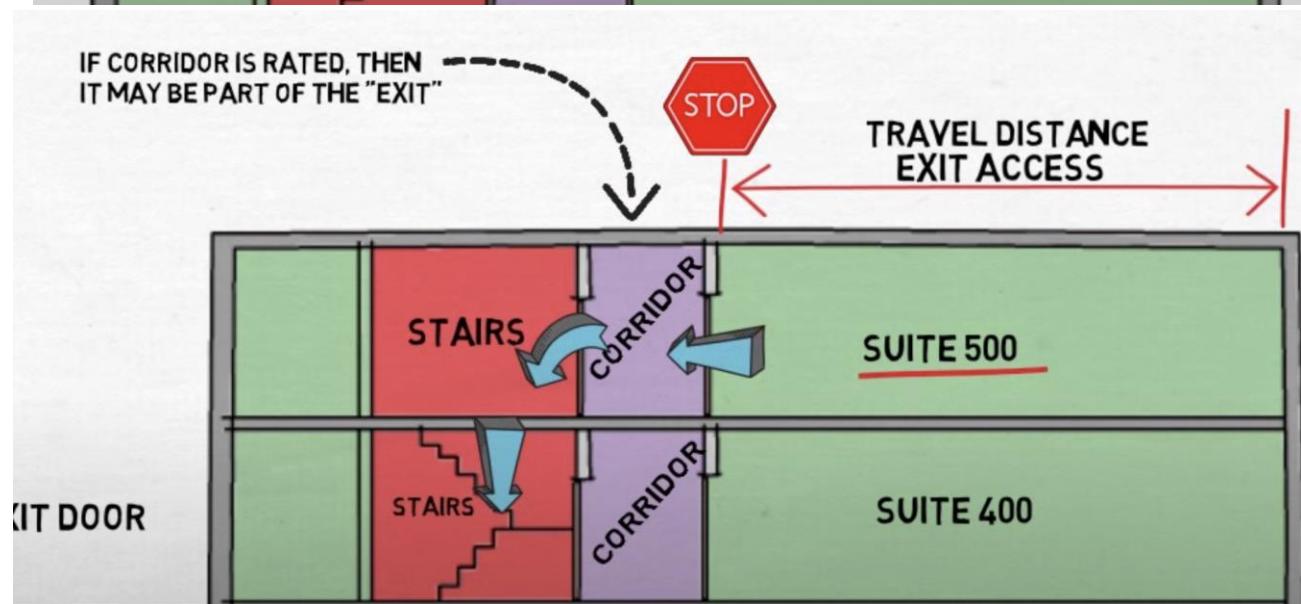
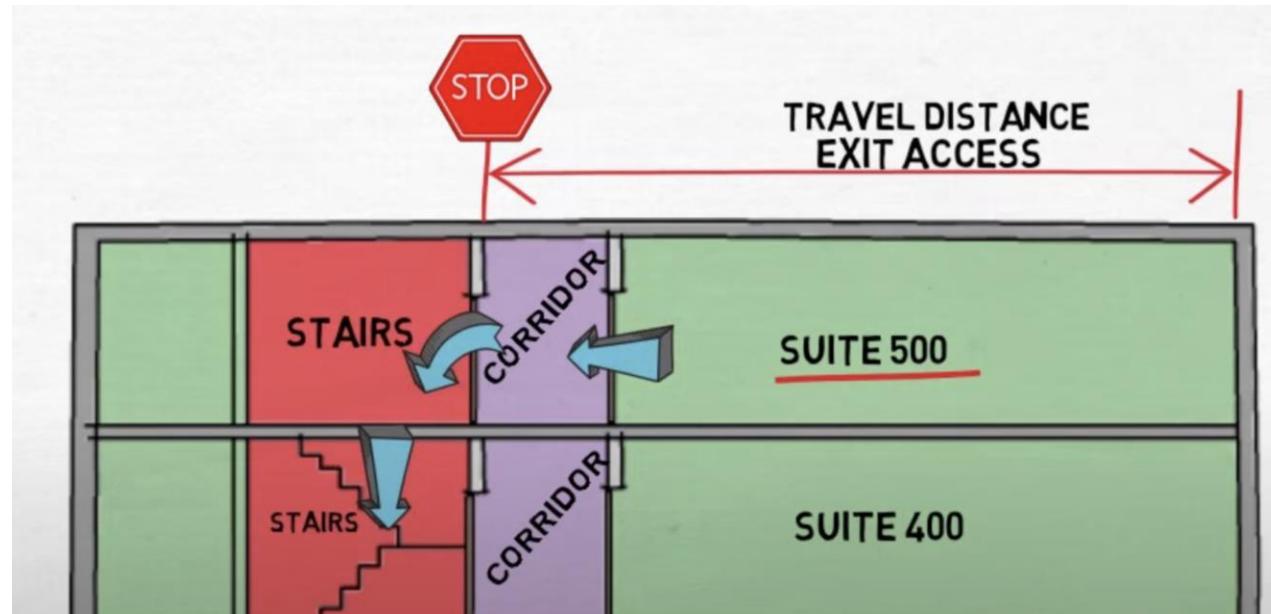
Special Attention

Source: 2021 IBC

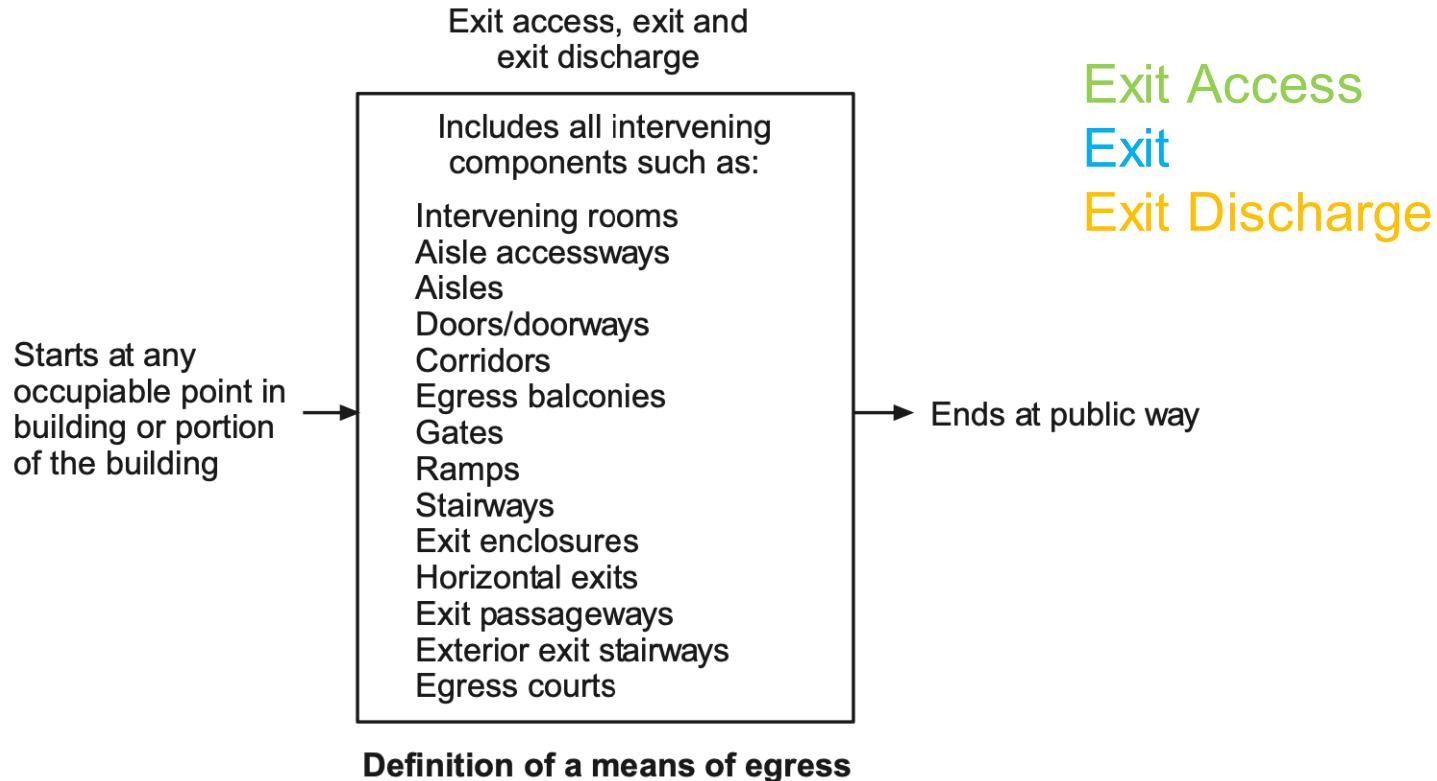
What is egress



What is exit access vs exit



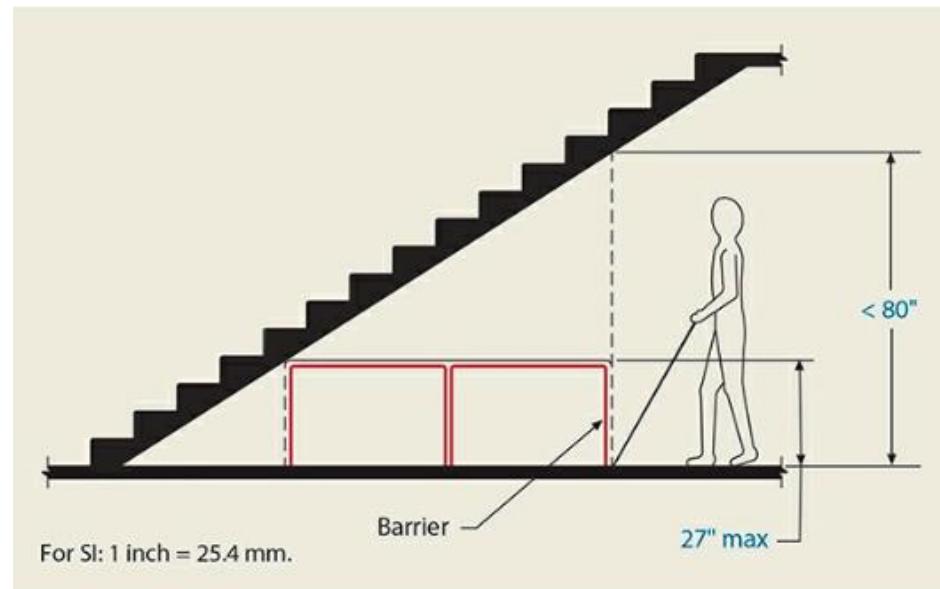
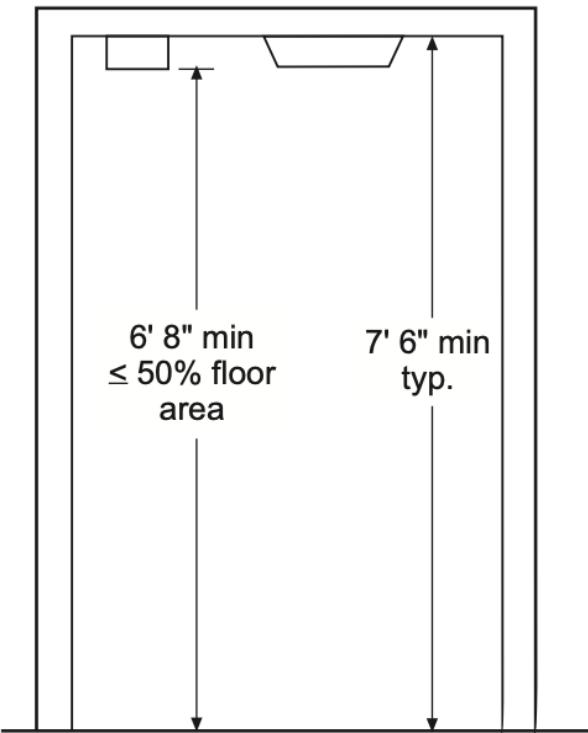
1001.1 General



Building components along the path of egress travel might include aisle accessways, aisles, doors or doorways, intervening rooms, gates, corridors, ramps, exit access stairways, interior exit stairways, exit passageways, horizontal exits, exterior balconies, exterior exit stairways and egress courts.

1003.2, Ceiling Height

[Minimum Stairway Ceiling Height - Building Codes And Accident Prevention - YouTube](#)



03-2 Reduced vertical clearance.

Corridor, aisle, passageway or any walking surface along egress of path travel

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

The minimum ceiling heights established for environmental concerns are addressed in Section 1208.2. Habitable spaces, such as bedrooms and living rooms in residential occupancies, occupiable spaces and corridors must be at least 7 feet 6 inches in height. In other areas, reduced headroom is permitted.

Source: 2021 IBC

1003.2, Ceiling Height

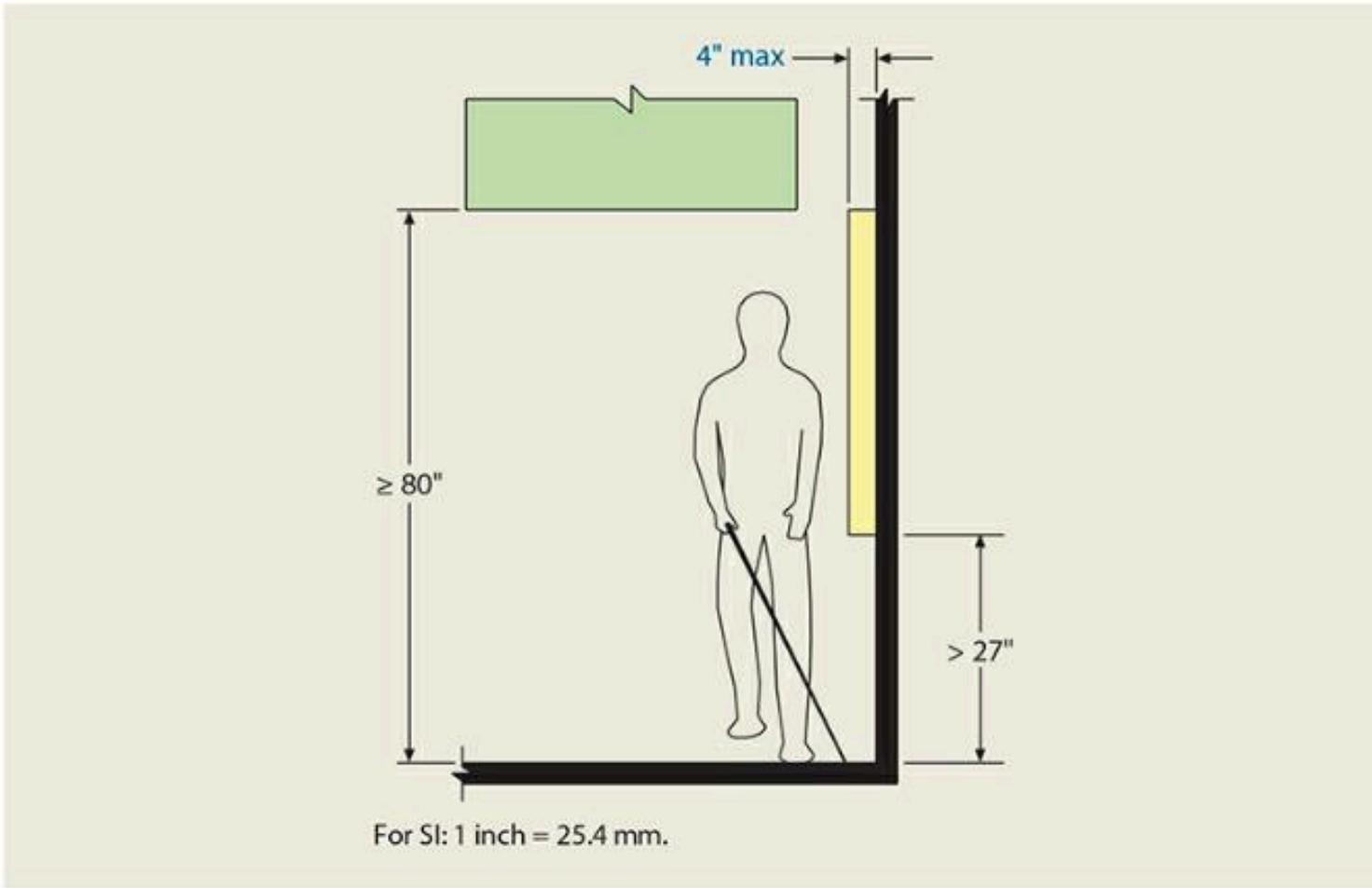


Figure 1003-4 **Limits of protruding objects.**

Source: 2021 IBC

1004.1, 1004.5 Design Occupant Load

[AC 022 - Egress: How to calculate occupant loads \(Part 2 of 2\) - Gross vs. Net. Sq. Ft. - YouTube](#)

TABLE 1004.5

MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

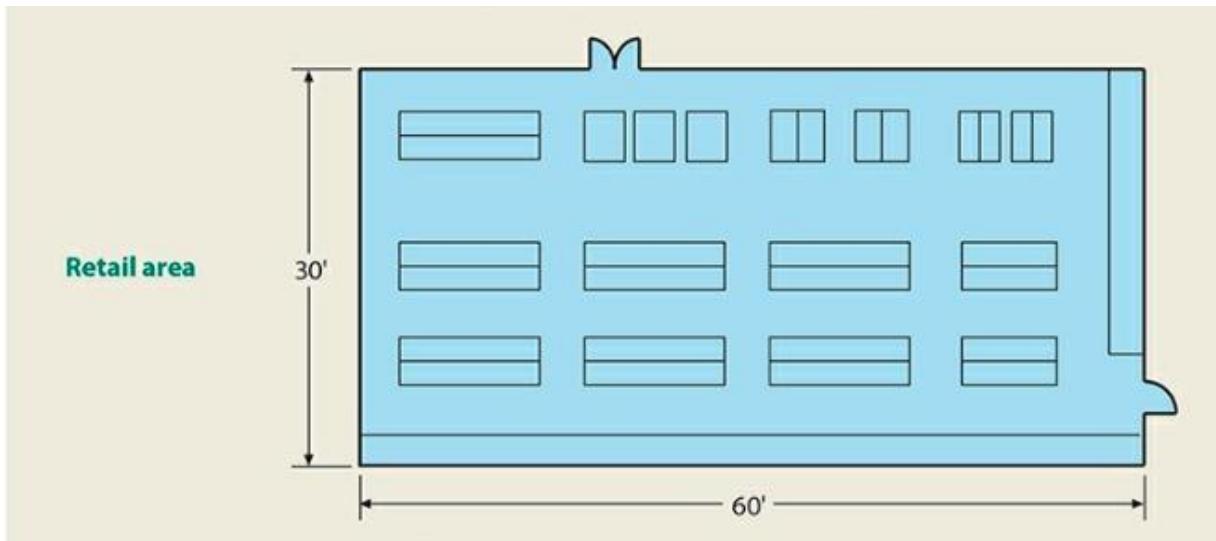
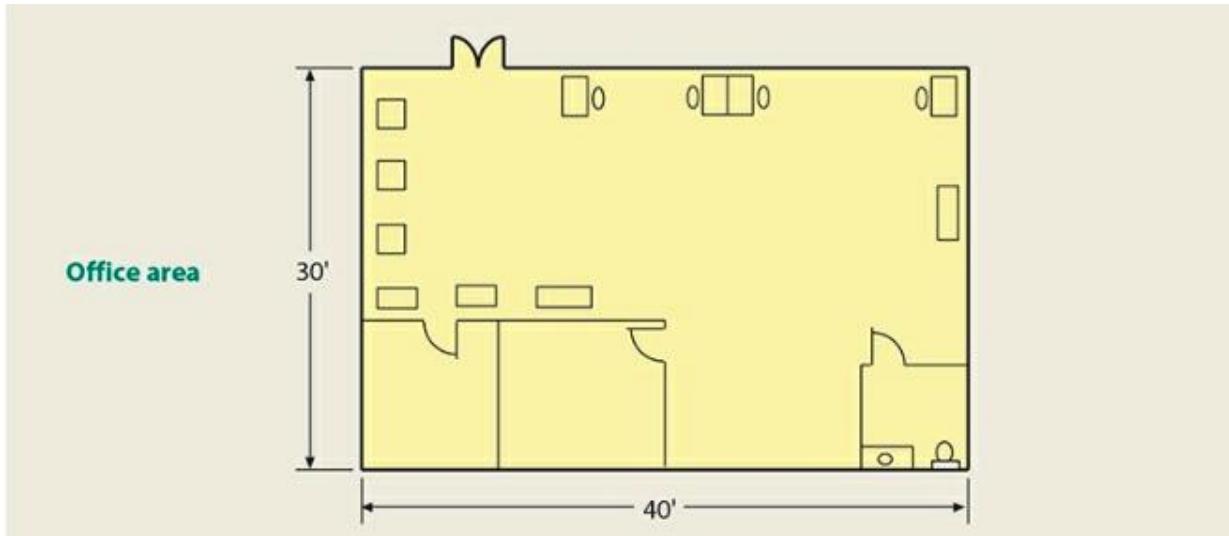
FUNCTION OF SPACE	OCCUPANT LOAD FACTOR ^a
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	

Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

a. Floor area in square feet per occupant.

1004.1, 1004.5 Design Occupant Load



Source: 2021 IBC

1004.1, 1004.5 Design Occupant Load

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1004.1, 1004.5 Design Occupant Load

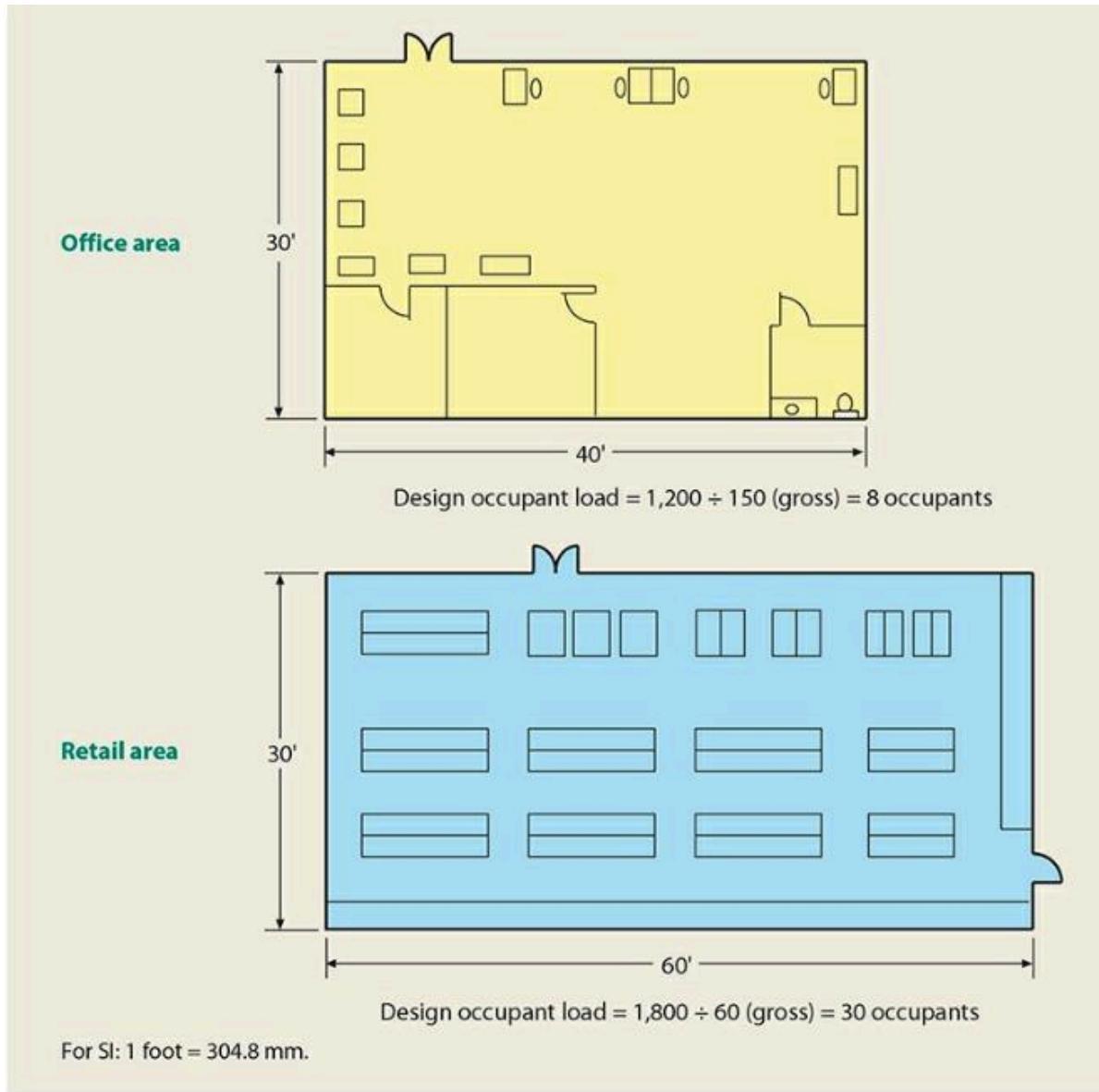


Figure 1004-5 Design occupant load examples.

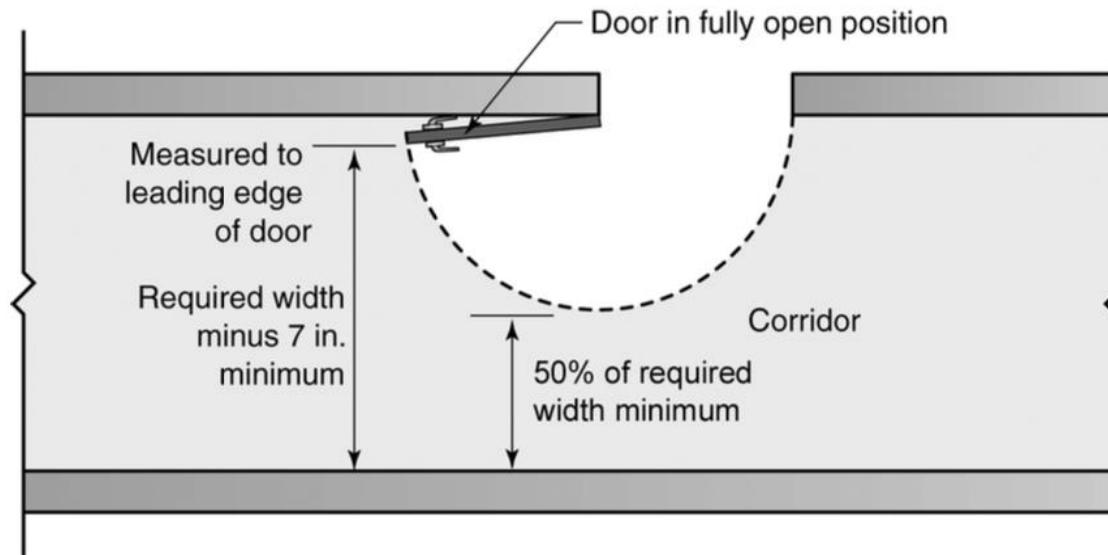
Source: 2021 IBC

1005.2, 1005.3 Width and Capacity

- The minimum width, in inches, of any means of egress components shall not be less than that specified for such component, elsewhere in the IBC. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.3 inches (7.6 mm) per occupant. The capacity, in inches, of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity factor of 0.2 inches (5.1 mm) per occupant. See the exceptions that reduce the capacity factors to 0.2 inches and 0.15 inches, respectively, for buildings equipped throughout with an automatic sprinkler system and an emergency voice/alarm communication system.
- In a given means of egress system, different components will afford different capacities. The most restrictive component will establish the capacity of the overall system. Doorways, aisles, stairways and corridors also have minimum established widths that must be provided.

1005.2, 1005.3 Width and Capacity

[AC 011 - Egress: How to Calculate Egress Widths. - YouTube](#)



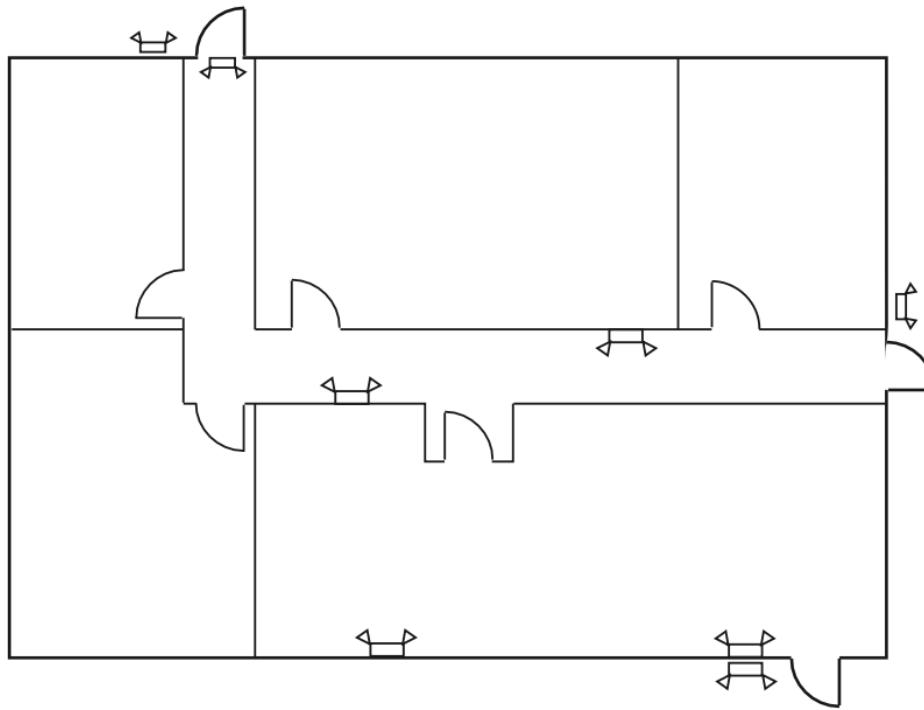
Measurement of minimum required egress width
Section 1005.7.1

Width, in terms of a means of egress system or component, is the clear, unobstructed usable width afforded along the exit path by the individual components. Unless the code provides for a permitted projection, the minimum required clear width may not be reduced throughout the travel path.

1008.2, 1008.3 Emergency Power

- The means of egress serving a room or space shall be illuminated at all times that the room or space is occupied. See the exceptions for (1) Group U occupancies; (2) aisle accessways in Group A; (3) dwelling and sleeping units in Groups R-1, R-2 and R-3; and (4) sleeping units of Group I. The power supply for means of egress illumination shall normally be provided by the premises electrical supply. In the event of power supply failure in rooms and spaces that require two or more means of egress, an emergency **electrical system shall automatically illuminate all of the following areas: (1) aisles, (2) corridors and (3) exit access stairways and ramps.** Additional requirements for emergency power for illumination is required for buildings that require at least two means of egress and for special spaces such as fire pump rooms and large public restrooms.
- Often identified as emergency lighting, a completely separate source of power from the premise's wiring system is required when the life-safety risk in a building becomes sufficiently great. This threshold is recognized as the point at which the occupant load of the room, area or building is high enough so that two means of egress are required.

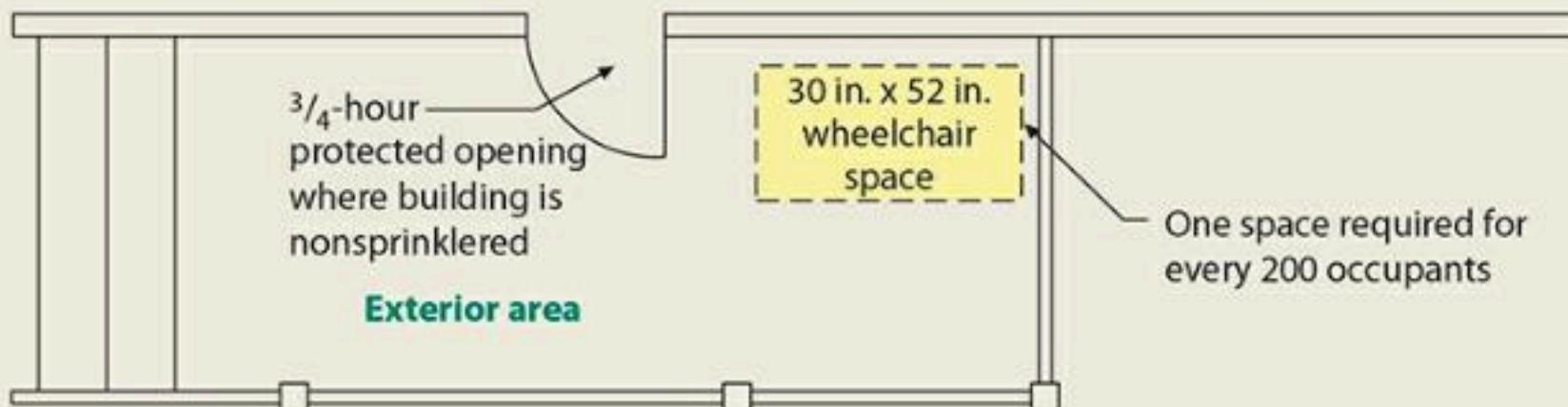
1008.2, 1008.3 Emergency Power



For the building occupant to be able to negotiate safely the means of egress system, the entire system must be illuminated any time the building is occupied. The illumination must provide an intensity of at least one foot-candle at the floor level. Stairway walking surfaces must be provided with at least 10 footcandles of illumination when the stairway is in use.

1009.1, 1009.2 General

In a nonsprinklered building, wall protected per Section 705, but at least a 1-hour wall a minimum of 10 ft horizontally beyond landing; and to a minimum height of 10 ft above floor level, or to the roof line, whichever is lower



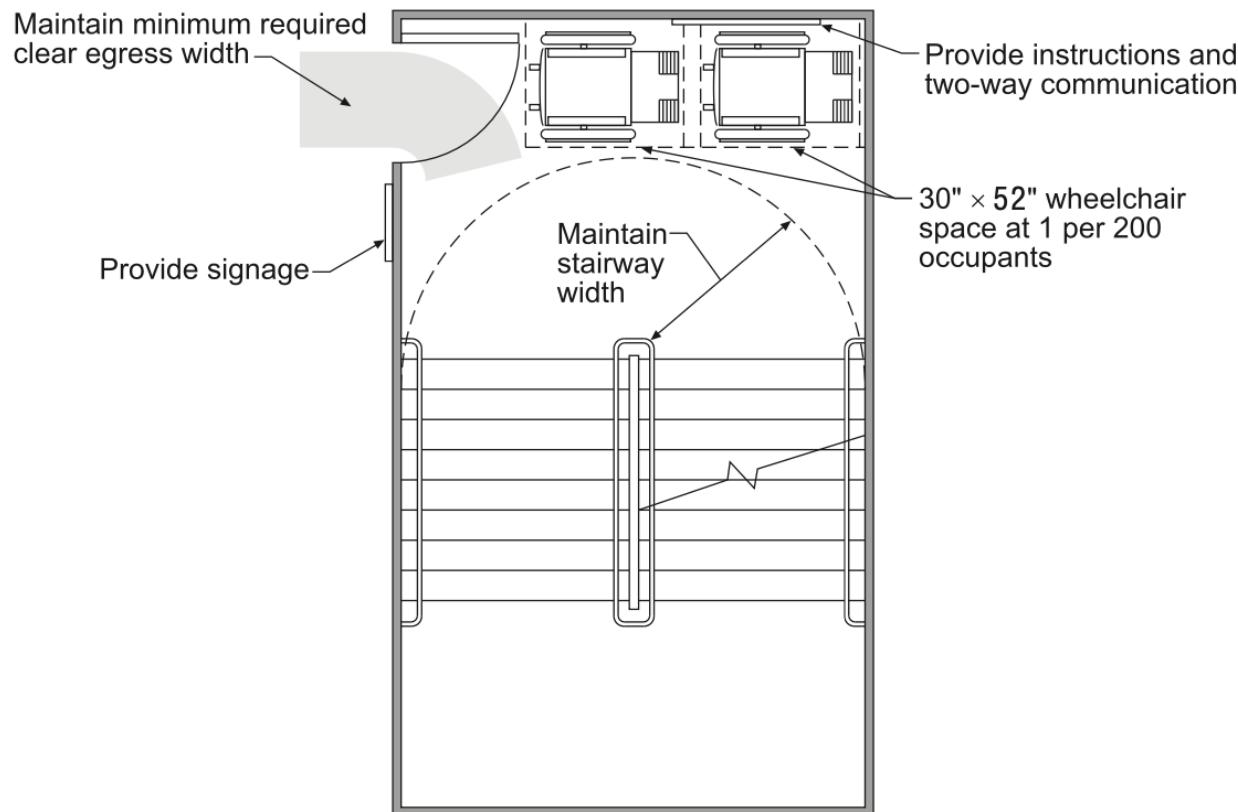
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Figure 1009-2 Exterior area for assisted rescue.

Exterior stairways and nonaccessible exit discharge areas may be served by exterior areas for assisted rescue. These specific exterior refuge areas must be adequately separated from the interior of the building by fire-resistance-rated construction and fire-protected openings.

Source: 2021 IBC

1009.6 Areas of Refuge



Required areas of refuge

For SI: 1 inch = 25.4 mm.

Although three or more means of egress from an accessible space may be required, only two of the exitways must be accessible. However, where an area of refuge is used as part of the egress system, the maximum travel distance set forth in Section 1017.2 must be maintained.

Source: 2021 IBC

1009.8 Where Required: Two Way Communication

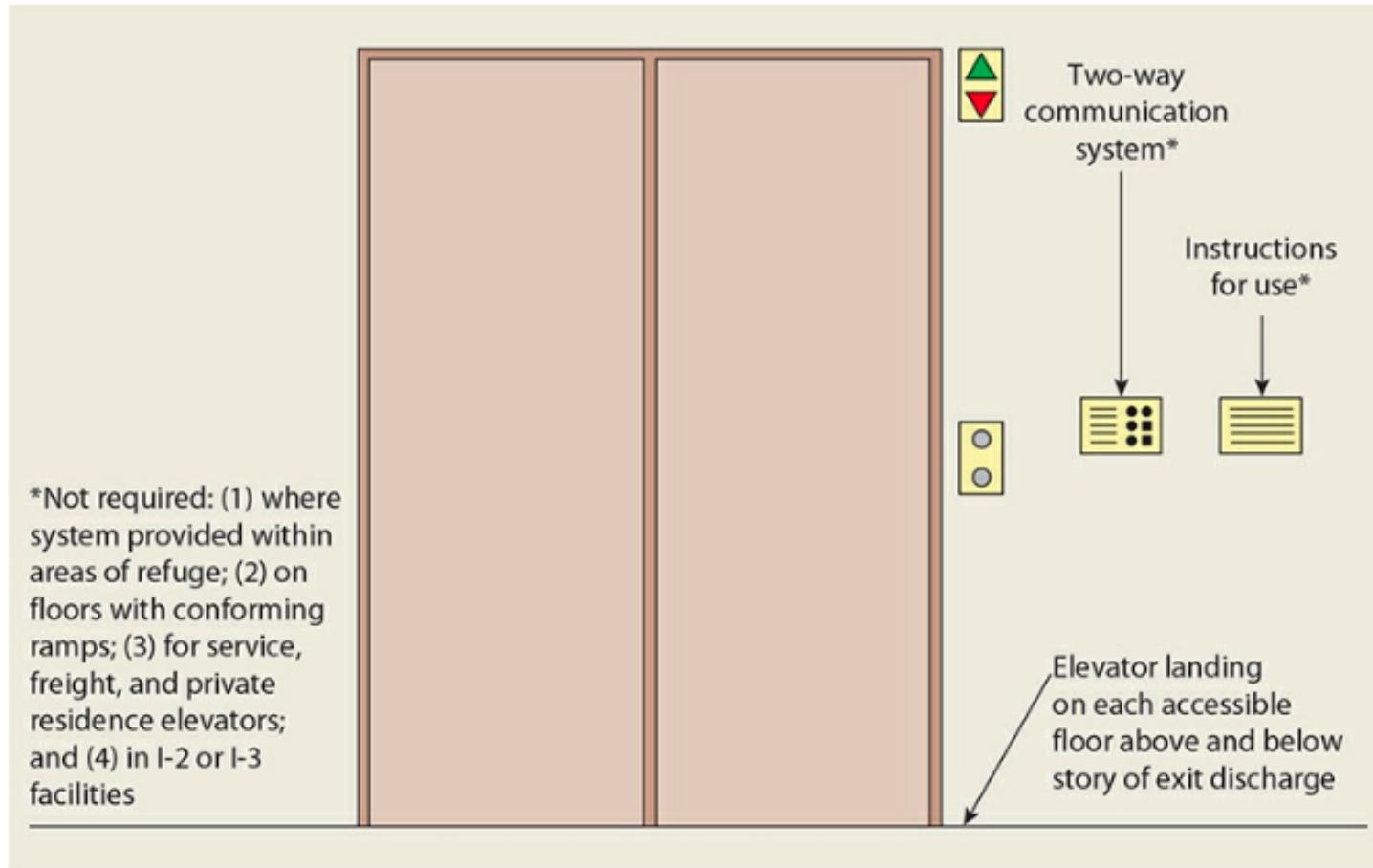


Figure 1009-3 Two-way communication system at elevator landing.

The provisions of Section 1009.6.5 require that all areas of refuge be provided with a two-way communication system. The specific requirements for the system are the same as those for the two-way communication systems mandated at elevator landings as set forth in Section 1009.8.

1010.6 Floor Elevations (Details in CH 11)

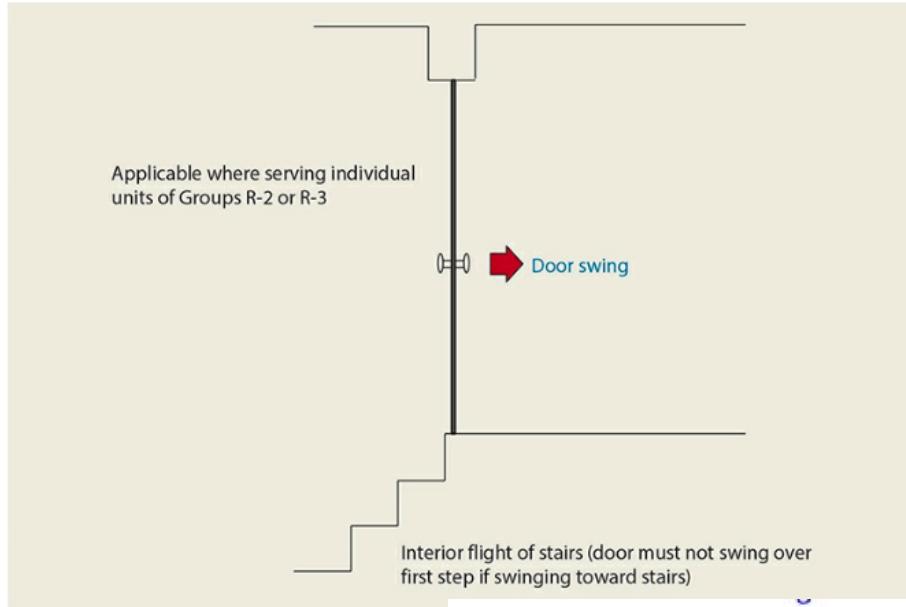


Figure 1010-6 Floor level at doors.

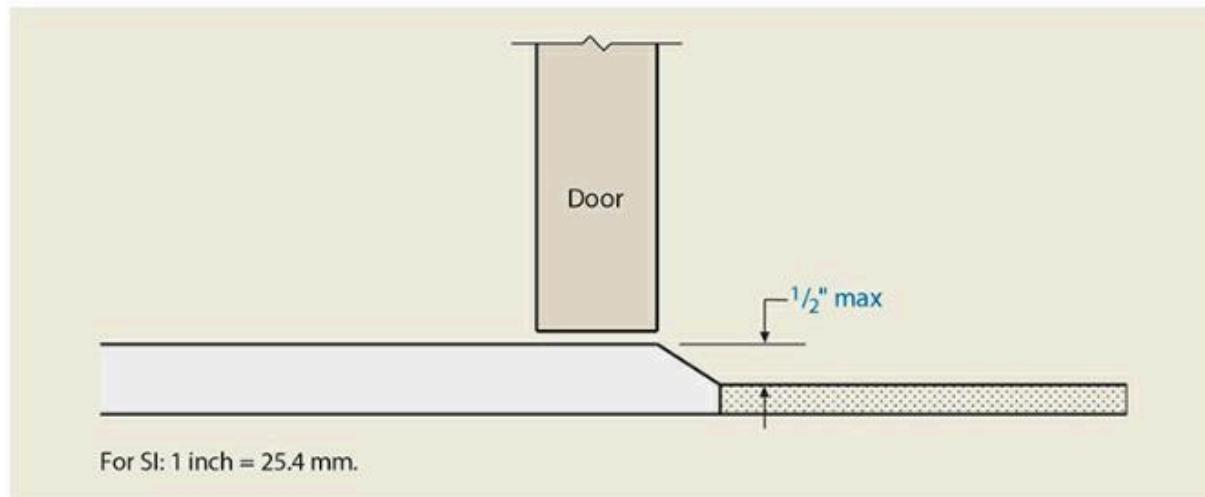
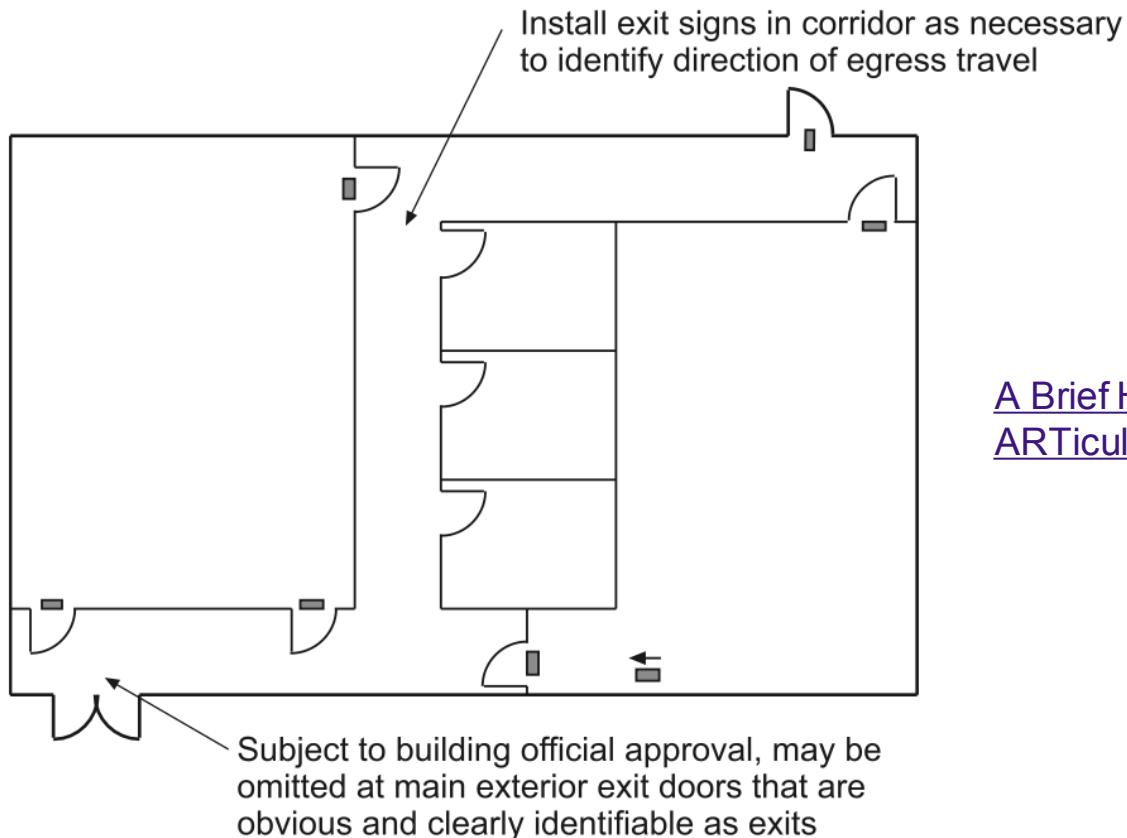


Figure 1010-5 Floor elevation.

Source: 2021 IBC

1013.1 Where Required: Exit Signs

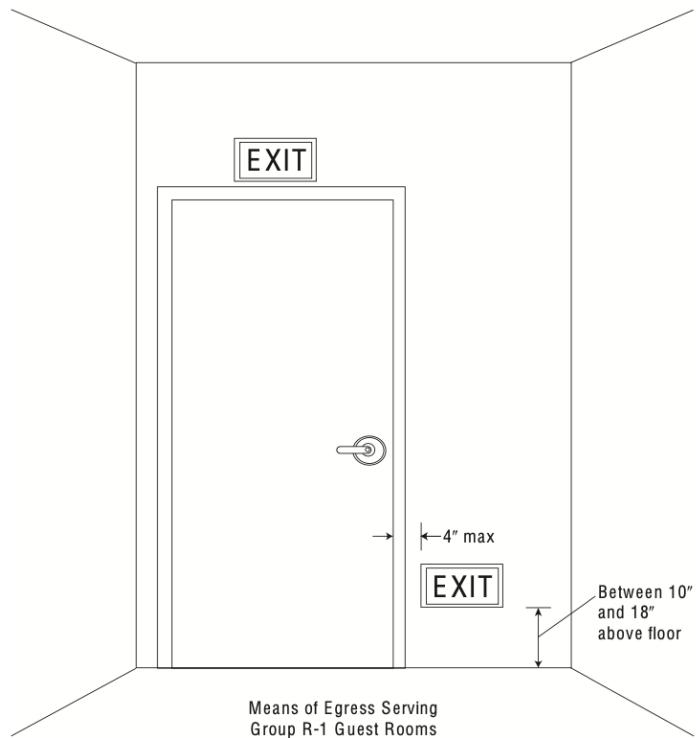


[A Brief History of the Exit Sign | ARTiculations - YouTube](#)

Additional exit signs may be necessary in lengthy exit access corridors and exit passageways to reinforce the direction of egress travel. It is possible that individuals subjected to extended travel would question the availability of an exit and attempt to locate an alternative egress path.

1013.2 Low-level Signs in Group R-1

[Exit Sign: Comment Responses |](#)
[ARTiculations - YouTube](#)



Low-level exit signs must be either electrically powered, self-luminous or photoluminescent exit signs that are listed and labeled in accordance with UL 924 and installed in accordance with the manufacturer's instructions. Consistent with the requirements for all other exit signs, low-level signs shall be illuminated at all times.

1013.3, 1013.6.3 Illumination and Power Source

- Exit signs shall be internally or externally illuminated. See the exception for tactile signs. Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of **not less than 90 minutes** in case of primary power loss, the sign illumination means shall be connected to an emergency system provided from storage batteries, unit equipment or an on-site generator.
- To ensure visibility under all conditions, required exit signs must always be illuminated. For those signs that are internally illuminated, which make up the vast majority of exit signs, compliance with UL 924 is mandated. Such exit signs, which includes electrically-powered, self-luminous and photo luminescent signs, must be listed and labeled. In addition, they must be installed in accordance with the manufacturer's installation instructions.

1013.3, 1013.6.3 Illumination and Power Source



Externally-illuminated exit signs are regulated through prescriptive requirements addressing the sign's graphics, illumination and power source. The word "EXIT" must be at least 6 inches in height, and at least 5 foot-candles of external illumination must be provided.

1014 Guard and Hand Rail

[When Do You Install A Guardrail or Handrail When Building Stairs? - Builders Education And Safety - YouTube](#)

[Code Compliance for Handrails and Guardrails - YouTube](#)

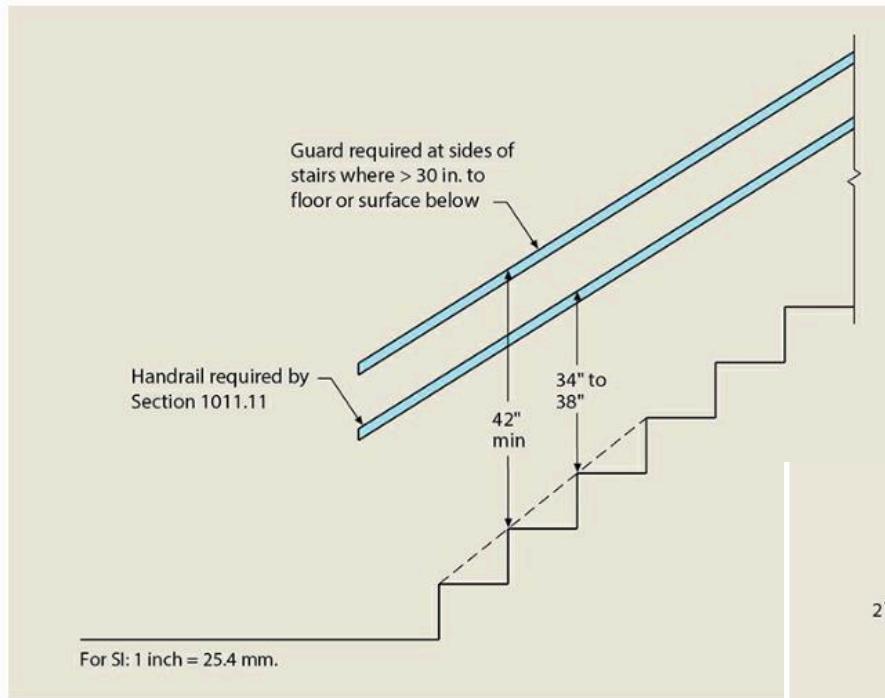


Figure 1014-1 Guard and handrail.

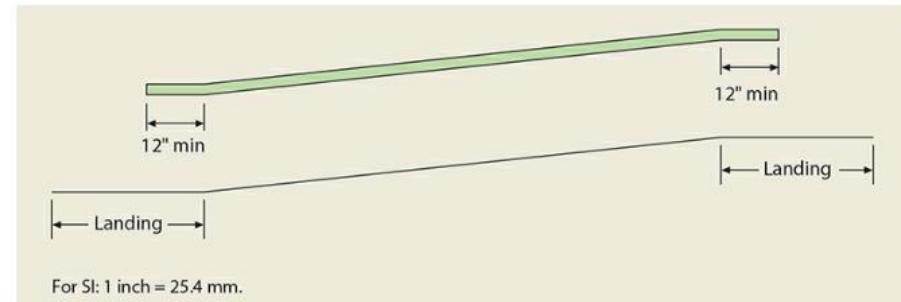


Figure 1014-6 Ramp handrail extensions.

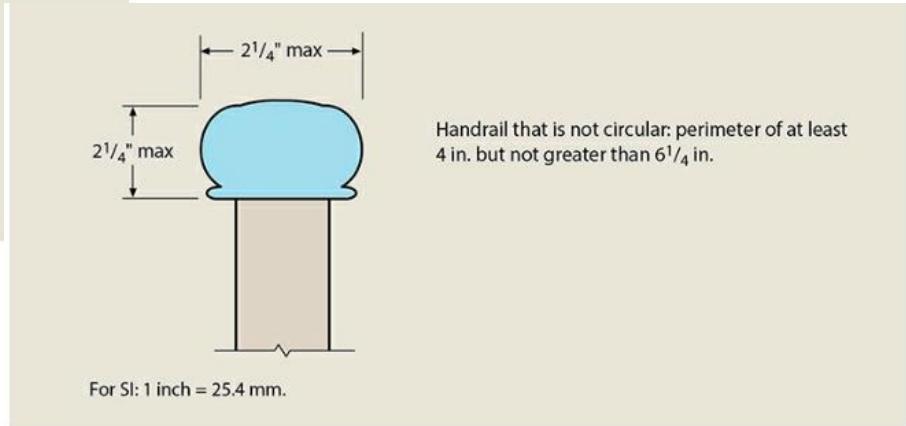


Figure 1014-2 Noncircular handrail.

1028 Exit Discharge

Exits are intended to discharge directly to the exterior of the building. Three exceptions permit the exit path to include a portion of the building beyond the exit component. An exception to the requirements for the continuity of interior exit stairways (and ramps) is permitted where a maximum of 50 percent of the exits pass through areas on the level of exit discharge. The path of travel to the exterior must be unobstructed and easily recognized. Sprinkler protection is required for the egress path between the termination of the interior exit stairway to the building's exterior, as is fire-resistance-rated construction isolating any areas below the discharge level.

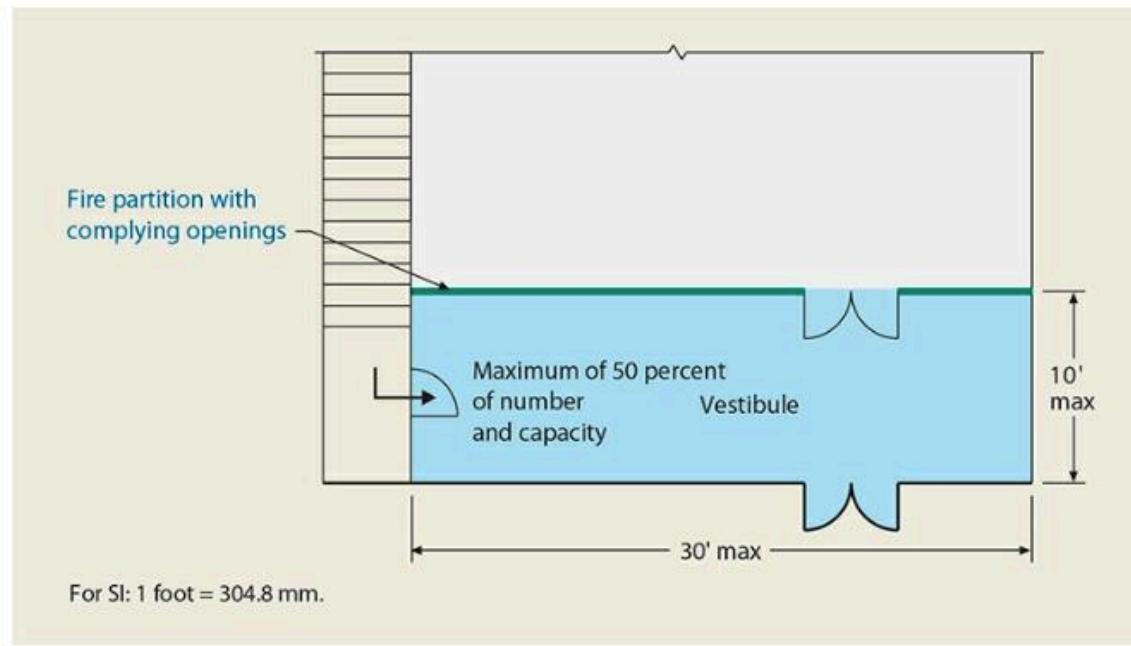


Figure 1028-2 Exit discharge through vestibule.

Class 10: Chapter 10, Sections 1010 through 1012 and 1014

Source: 2021 IBC

1001 Objective

- To obtain an understanding of the general system design requirements of a means of egress system, including the determination of occupant load, the required width and capacity of egress components, means of egress identification and illumination, accessible means of egress and the provisions regulating guards.

Chapter Overview

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AC 027 - IBC requirements: What is the required distance between exit doors? - YouTube

Exit Access

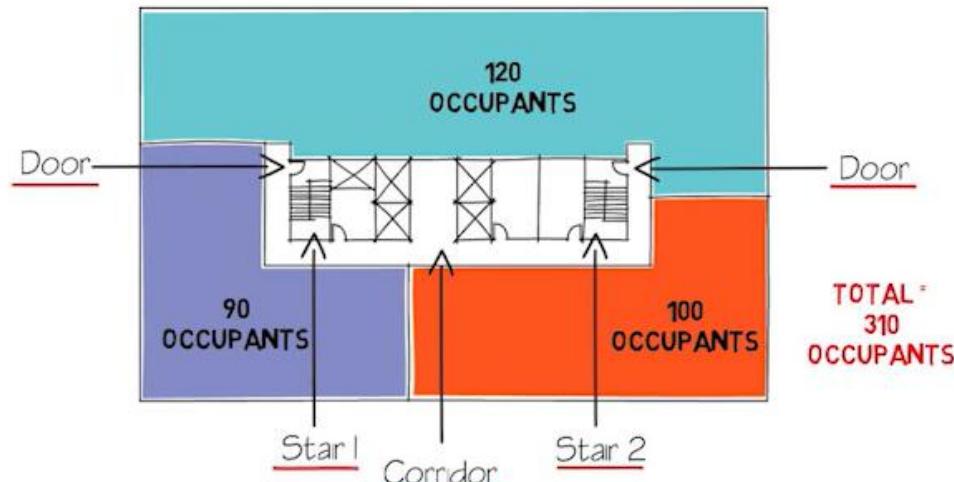
Exit

Exit Discharge

Special Attention

Source: 2021 IBC

1010 Objective



WIDTH REQUIREMENTS

STAIRS	MIN. WIDTH REQUIREMENTS IBC 1011.2 44 INCHES	WIDTH BASED ON OCC. LOAD IBC 1005.3.1 0.3 INCHES PER OCCUPANT 310 OCC. X 0.3 INCHES = 93 INCHES MIN. 93 INCHES / 2 STAIRS = 46.5 INCHES MIN. PER STAIR
DOORS	IBC 1010.1.1 32 INCHES CLEAR WIDTH.	IBC 1005.3.2 "OTHER COMPONENTS" 0.2 INCHES PER OCCUPANT 310 OCC. X 0.2 INCHES = 62 INCHES MIN. 62 INCHES / 2 STAIRS = 31 INCHES MIN. PER DOOR
CORRIDORS	IBC 1020.1.2 44 INCHES CLEAR WIDTH.	IBC 1005.3.2 "OTHER COMPONENTS" 0.2 INCHES PER OCCUPANT 310 OCC. X 0.2 INCHES = 62 INCHES MIN.

Source: 2021 IBC

1010 Objective

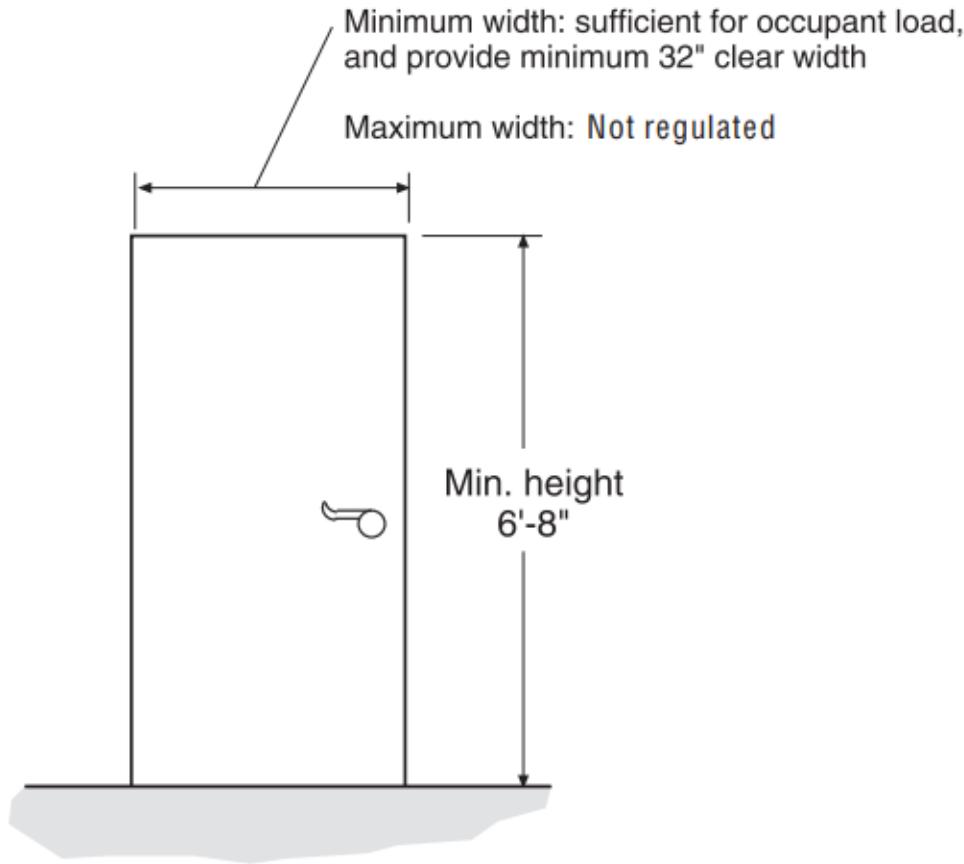
- To obtain an understanding of the general system design requirements of a means of egress system, including the determination of occupant load, the required width and capacity of egress components, means of egress identification and illumination, accessible means of egress and the provisions regulating guards.

[AC 030 - Occupant Load vs Occupancy Groups - YouTube](#)

[AC 029 - Number of Exits, Travel Distance & Common Path of Travel - YouTube](#)

[Calculating Occupant Loads and Egress Width - YouTube](#)

1010.1 Additional Doors and Identification



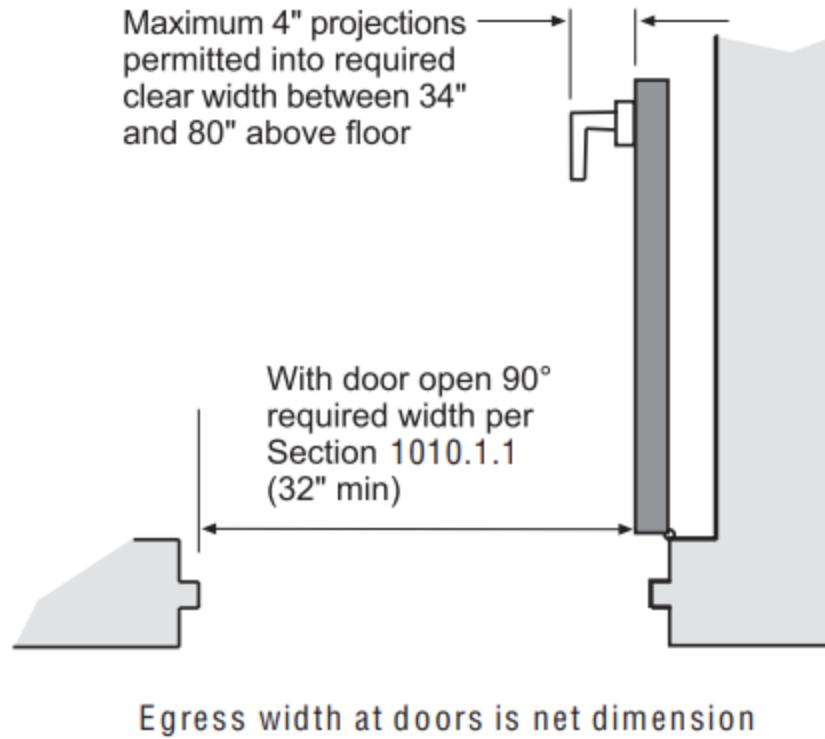
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

In accordance with Section 1022.2, any building or structure used for human occupancy must have at least one exterior door opening that complies with the minimum width (32 inches) and height (80 inches) requirements of Section 1010.1.1.

1010.1.1 Sizes of Doors

- The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The minimum clear opening height of doors shall not be less than 80 inches (2032 mm). See the exceptions for clear opening width.
- A clear width of 32 inches is required only to a height of 34 inches above the floor or ground. Beyond this point, projections up to 4 inches into the required width are permitted. Although a single doorway is expected to be used for the egress of one individual at a time, it must also be of adequate width for wheelchair users.

1010.1.1 Sizes of Doors

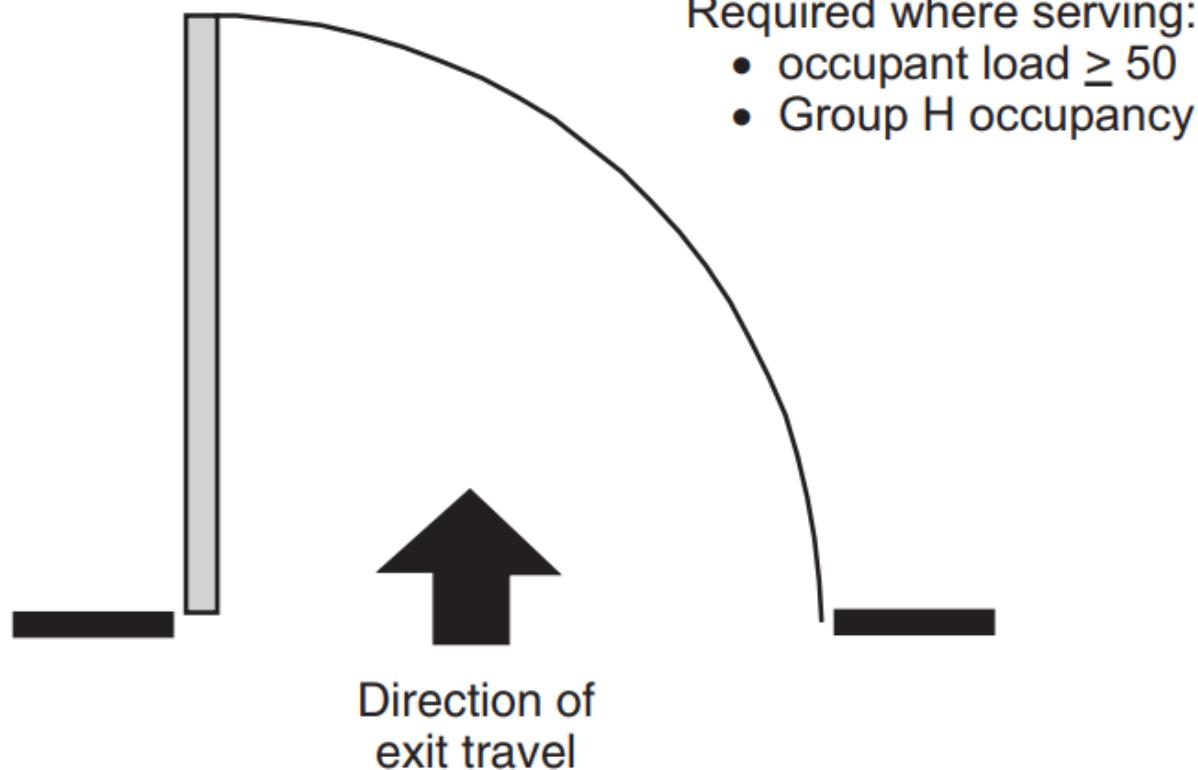


For SI: 1 inch = 25.4 mm, 1 degree = 0.01745 rad.

The maximum width of a door leaf is not regulated by the code. It is expected that a reasonable door opening effort is addressed in Section 1010.1.3 through the regulation of force levels necessary to unlatch and open a door.

1010.1.2 Sizes of Doors

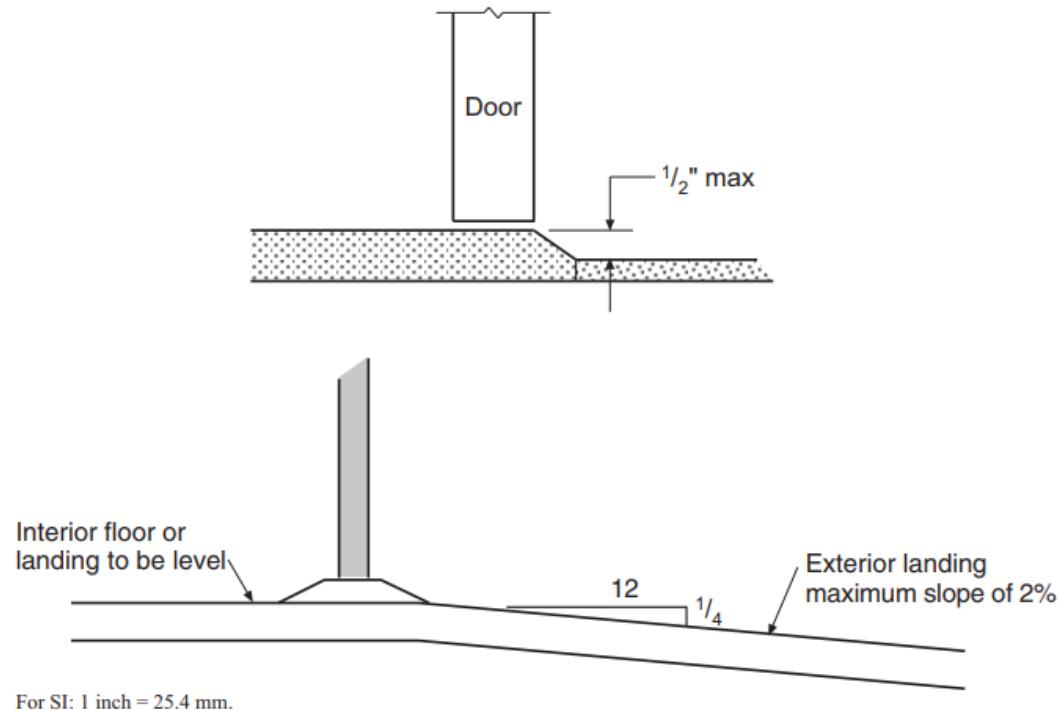
[Which Doors Can Swing or Open Over A Stairway? - Building Code Information - YouTube](#)



The maximum force needed to unlatch doors in the means of egress is regulated for two conditions: where door hardware operates by push or pull, and where door hardware operates by rotation. The force required to open the door is regulated based on the specific door type.

1010.1.4 Floor Elevation

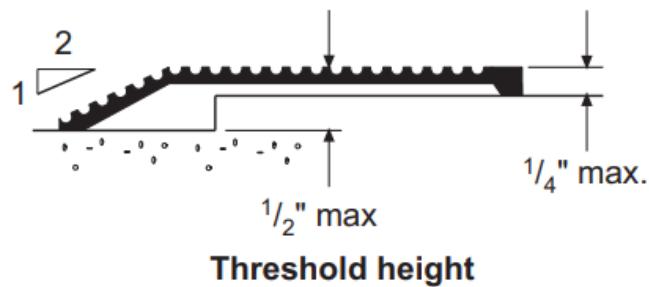
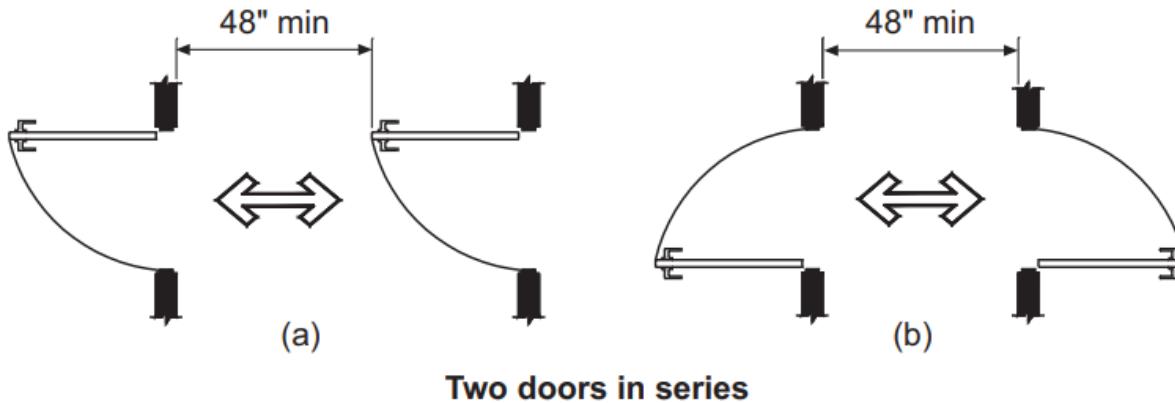
[Forensic Architecture Elevation Changes in International Building Code. - YouTube](#)



For interior situations, landings should be level. In exterior applications, landings may have a slope not to exceed $\frac{1}{4}$ unit vertical in 12 units horizontal (1:48). This maximum slope of 2 percent provides a relatively flat surface while maintaining adequate drainage.

Source: 2021 IBC

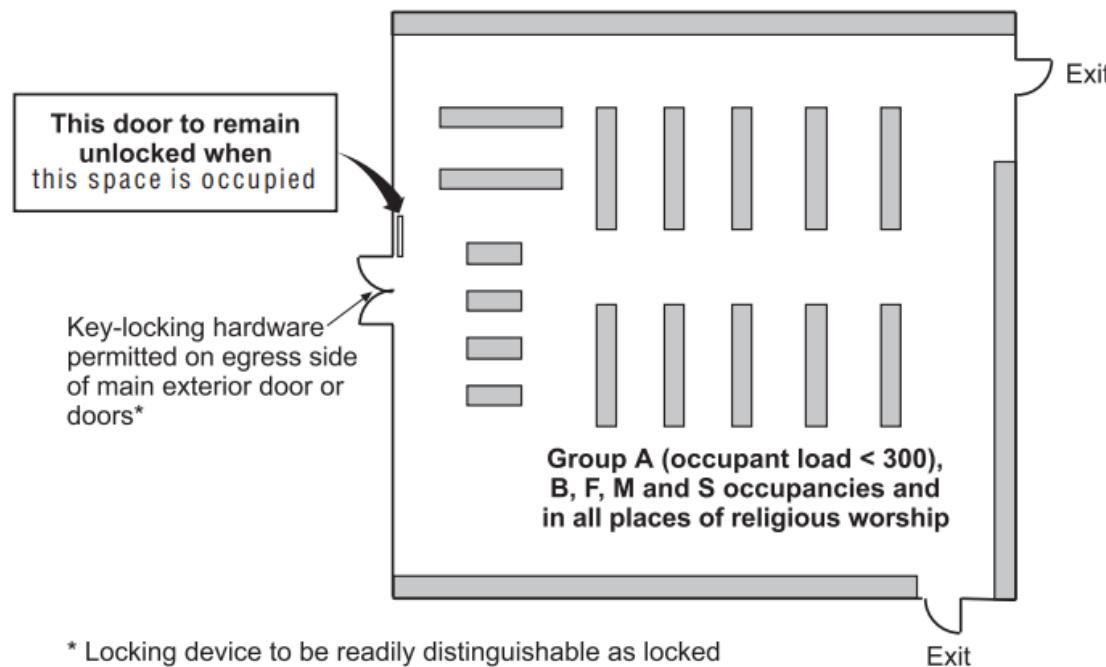
1010.1.7 Door Arrangement



For SI: 1 inch = 25.4 mm.

It is also important that a threshold at a door does not overly restrict safe and efficient passage through the doorway. Where a bevel of 1:2 or less is provided, the maximum threshold height is $\frac{1}{2}$ inch. Otherwise, an abrupt change in elevation is limited to $\frac{1}{4}$ inch.

1010.2 Operations

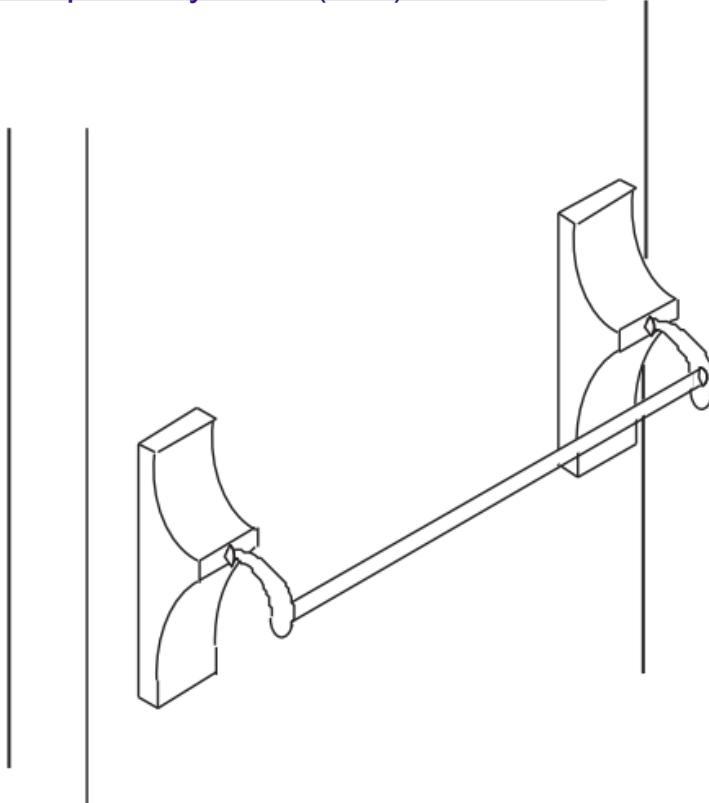


Section 1010.2.4, Exc. 3

A major exception to the lock/latch provisions applies to Groups B, F, M and S occupancies, as well as to places of religious worship and smaller assembly uses. Key-operated locking devices from the egress side of doors are permitted under limited conditions, based on compensating safeguards.

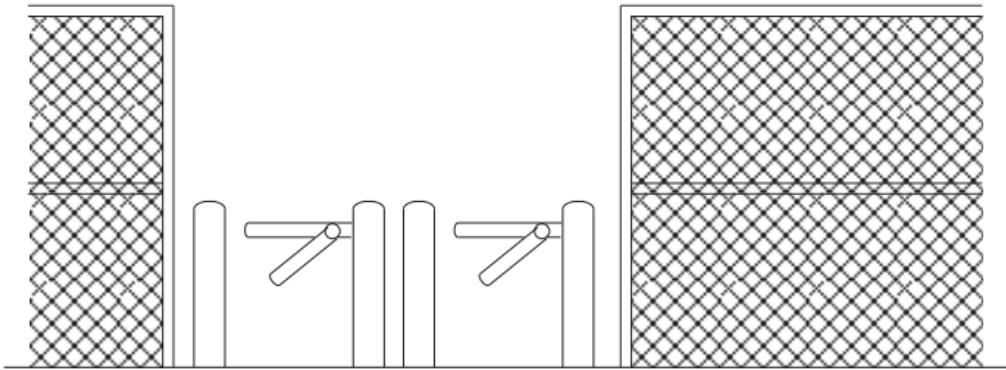
1010.2.9 Panic and Fire Exit Hardware

[AC 017 - Egress: Where is Panic Hardware or Fire Exit Hardware Required by Code \(IBC\)? - YouTube](#)



To ensure that contact with the door actuates the releasing device, the code requires that the actuating portion extend for at least one half of the door width. Where balanced or pivoted doors are used, the device width is again limited to one-half of the door width for leverage purposes.

1010.5 Turnstiles



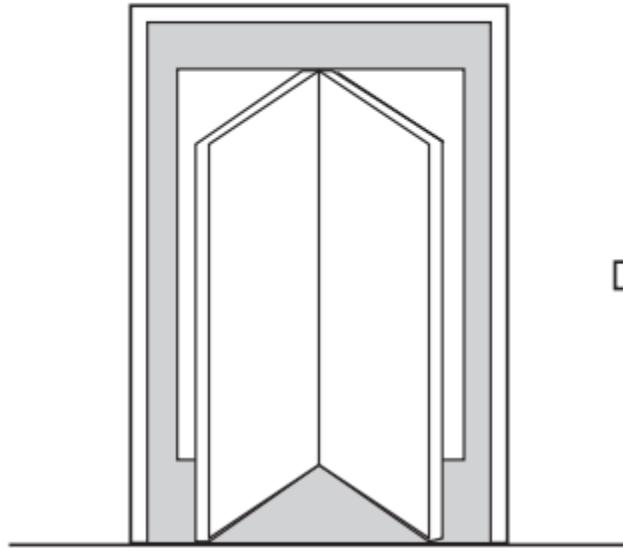
Each turnstile credited for up to 50-person capacity for egress where each turnstile:

- Will turn freely in direction of egress when power is lost, and upon manual release by employee in area
- Only given credit for 50% of required egress capacity (egress other than by turnstiles required)
- Limited to 39 inches in height
- Has minimum of $16\frac{1}{2}$ inches clear width at and below height of 39 inches
- Has minimum of 22 inches clear width at height above 39 inches

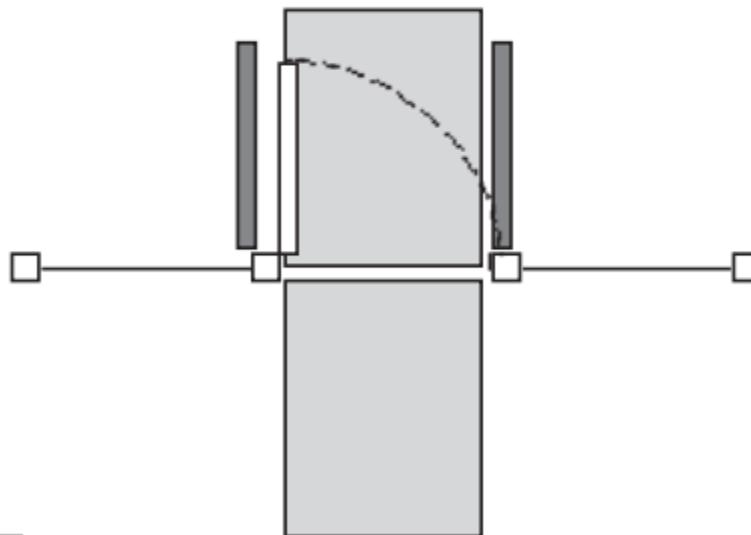
Where the turnstile has a height exceeding 39 inches, the restriction to egress is much like that of a revolving door, and the provisions in Section 1010.3.1 apply to this higher type of turnstile. Compliance as a security access turnstile is also permitted.

1010.3 Special Doors

Revolving door



Power-operated door



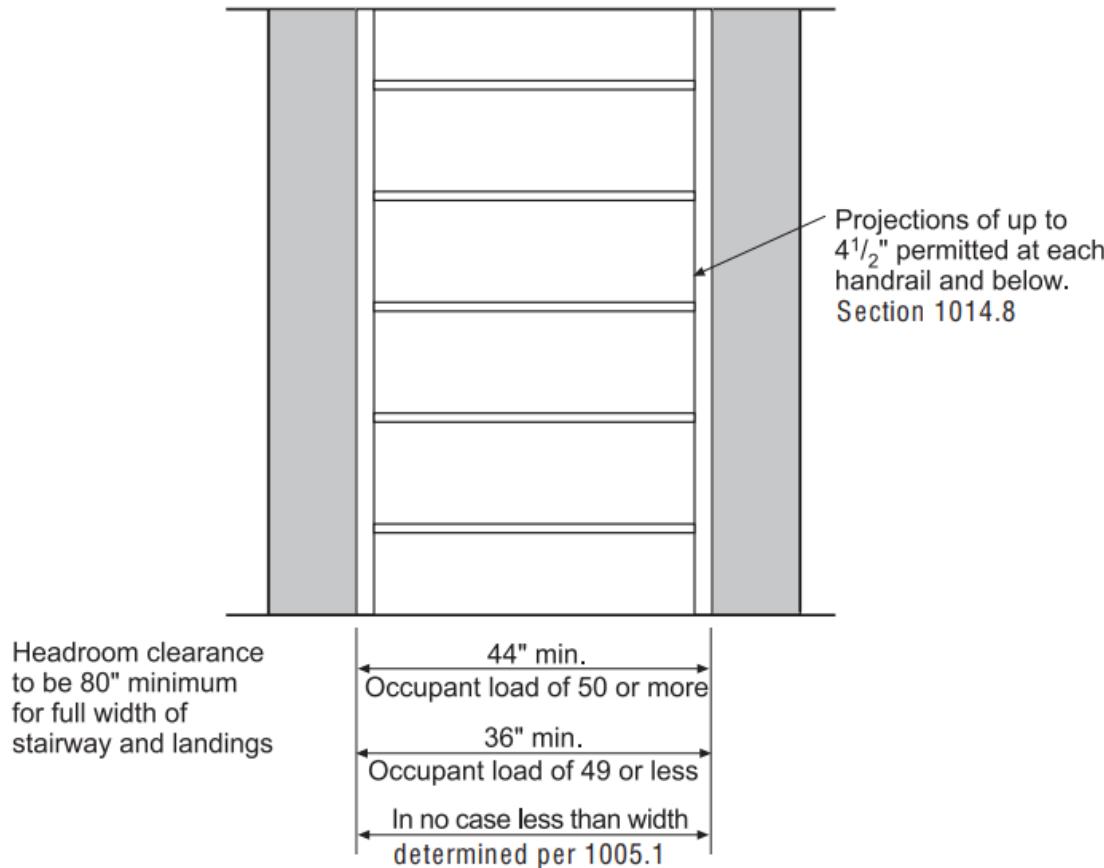
The various types of special doors are permitted to be used for egress purposes when regulated by occupancy, occupant load, operation, opening force, power supply or other factors that contribute to the effectiveness and reliability of the egress door.

1011.1 General Provision Stairways



The provisions of Section 1011 regulating the design and construction of stairways are applicable to all stairways, including those that may be considered only "convenience" stairs and not considered a portion of any required means of egress.

1011.2, 1014.8 Stairways Width

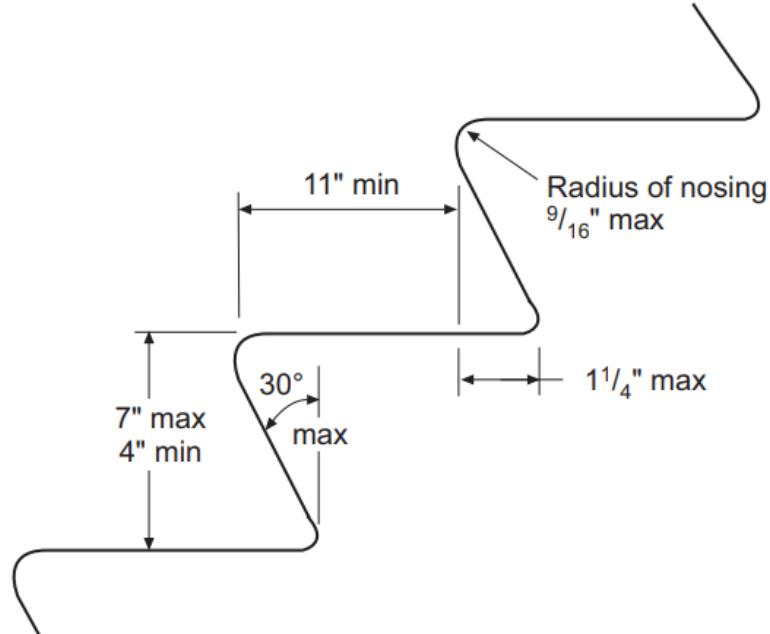


For SI: 1 inch = 25.4 mm.

Stringers, trim and similar decorative features may project a limited amount into the required stairway width unless located above the handrail. Between the rail and the required headroom height of 80 inches, no projection into the required width is permitted.

Source: 2021 IBC

1011.5 Stair Treads and Risers

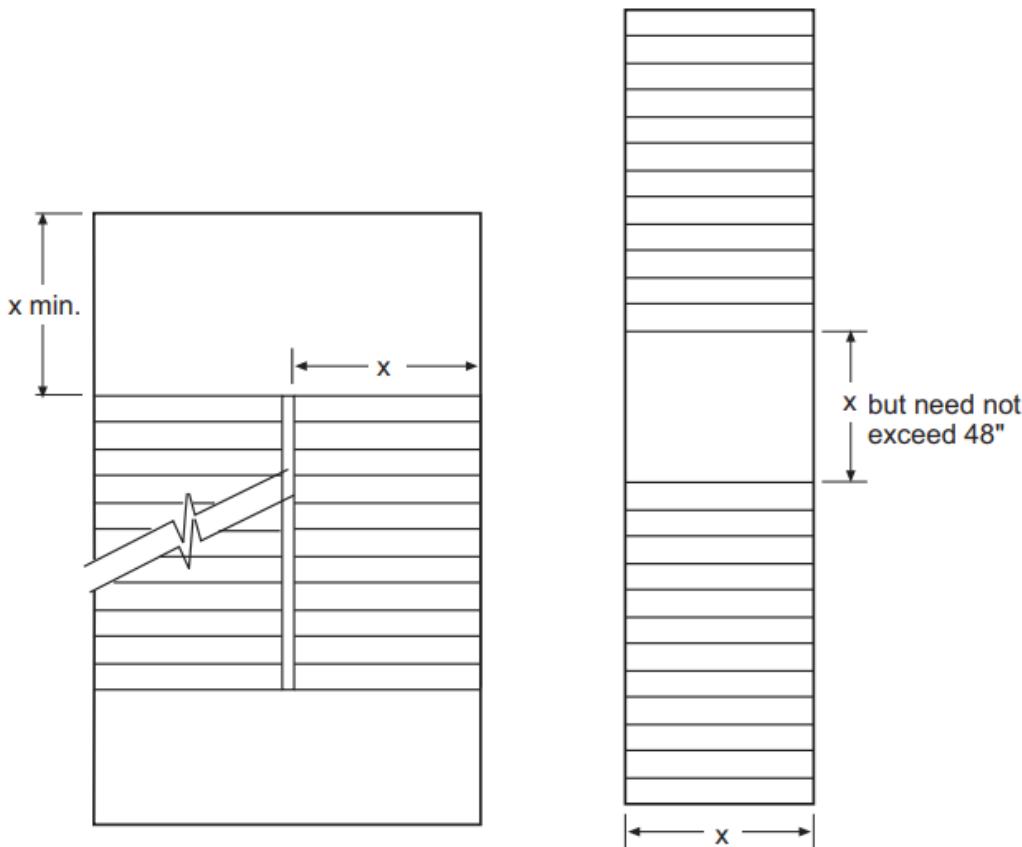


Treads and risers to be of uniform size and shape
($\frac{3}{8}$ " tolerance permitted between least and greatest within flight)

For SI: 1 inch = 25.4 mm, 1 degree = 0.01745 rad.

Curved stairways, winders, spiral stairways, aisle stairs and alternating tread devices are unique configurations requiring special consideration. The use of these stairways is limited to varying degrees based on occupancy, occupant load, design and use as a required means of egress.

1011.6 Stairway Landing

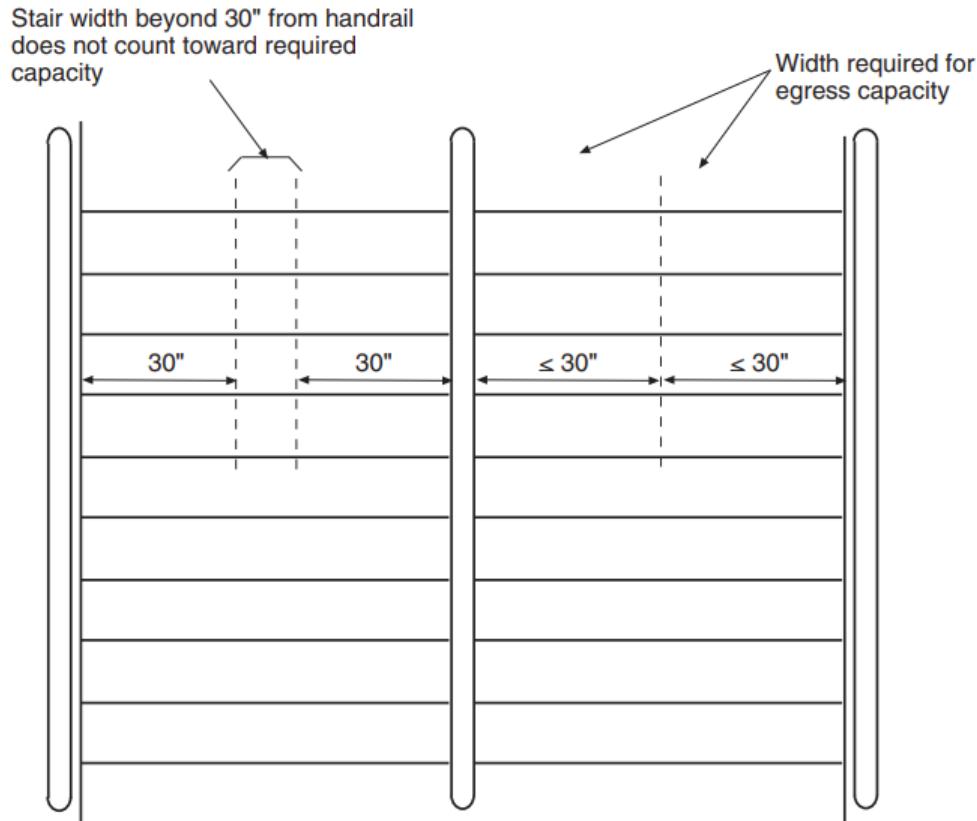


For SI: 1 inch = 25.4 mm.

Because of the difficulty many individuals encounter while negotiating stairs, the code requires a maximum vertical rise between landings of 12 feet. When placed at limited intervals, landings can be used as a resting place for the stair user and can also make stair travel less intimidating.

Source: 2021 IBC

1011.11, 1014.9 Handrail Locations

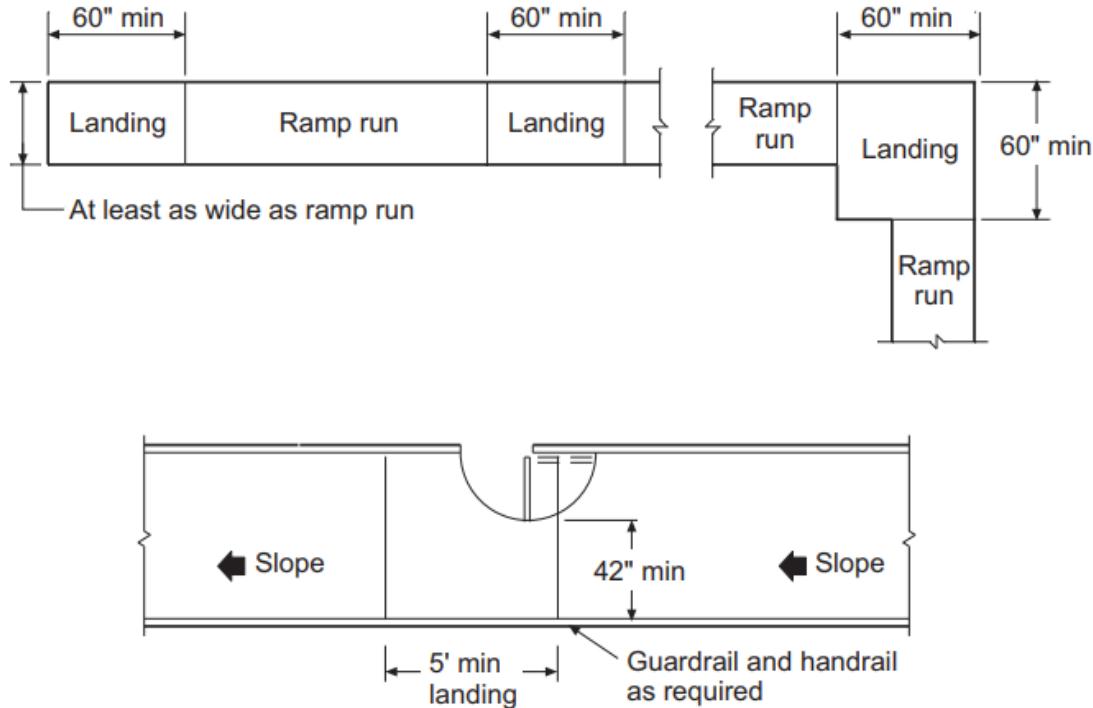


For SI: 1 inch = 25.4 mm.

Various exceptions permit the use of a single handrail, and in some cases no rail, within a dwelling unit. In addition, and applicable to all occupancies, handrails are not required for decks, patios and walkways at any single elevation change where complying landings are provided on each side.

Source: 2021 IBC

1012 Slope, Rise, Width and Handrails

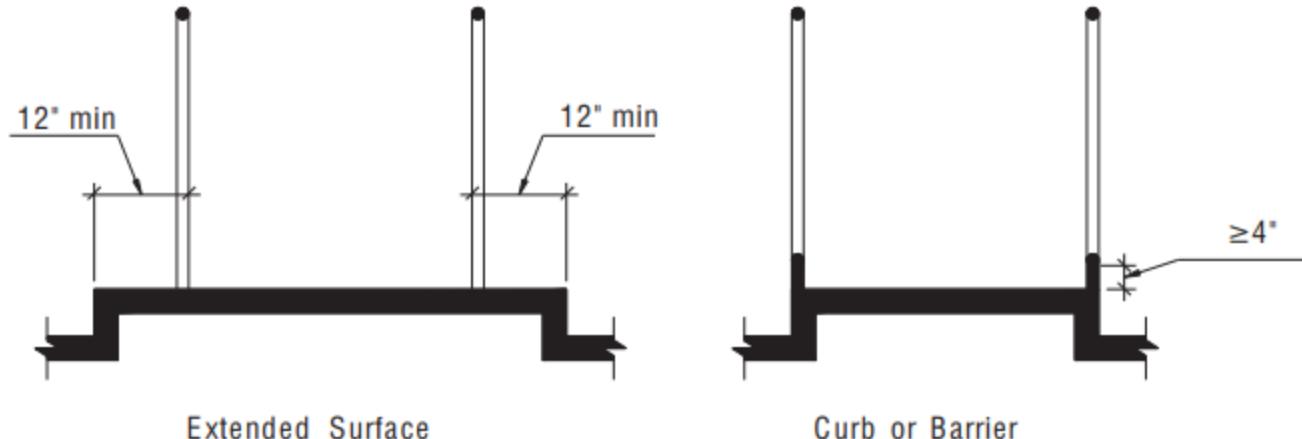


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

To provide adequate clearance at ramp landings, doors cannot reduce the clear landing width to less than 42 inches. A landing must be at least 60 inches in length and at least as wide as the widest ramp run adjoining the landing.

Source: 2021 IBC

1012.19 Edge Protection

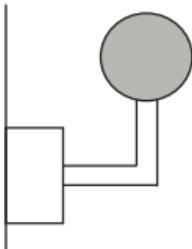


For SI: 1 inch = 25.4 mm

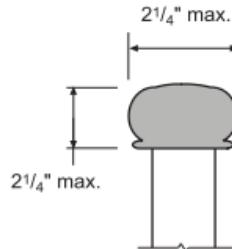
Edge protection is different than that type of protection provided by a guard. The presence of a complying guard does not necessarily provide adequate edge protection, and the presence of adequate edge protection does not typically satisfy the requirements for a guard.

1014.2, 1014.3 Handrail Dimensions

[Geeking Out on Building Codes | Handrails - YouTube](#)

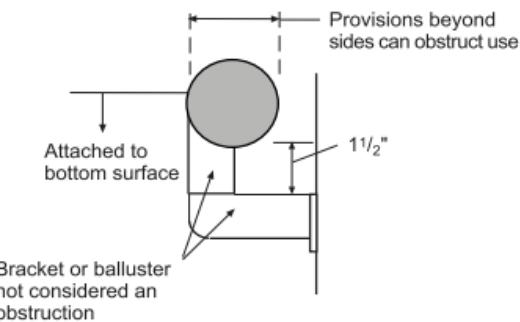


HANDRAIL with circular cross section:
 $1\frac{1}{4}$ " min., 2" max. diameter or provide
equivalent graspability

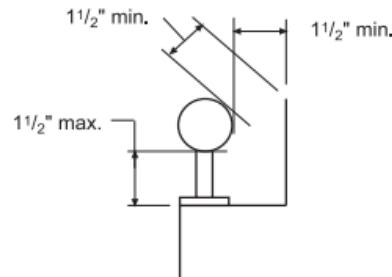


HANDRAIL that is not circular:
perimeter of at least 4" but not greater
than $6\frac{1}{4}$ "

TYPE I HANDRAILS



Section 1014.4



Section 1014.7

For SI: 1 inch = 25.4 mm.

A major goal of handrail design and location is to make it easily graspable; hence, it is mandatory that the rail be placed at least $1\frac{1}{2}$ inches from any abutting elements, such as a wall. However, the projection of the rail into the required width is limited to no more than $4\frac{1}{2}$ inches.

Source: 2021 IBC

Class 11: Chapter 10, Sections 1006, 1007 and through 1016 and 1021

Source: 2021 IBC

Objective

- To obtain an understanding of the system design requirements for the exit access, including number of exits, separation of egress doorways and maximum travel distances, as well as the requirements for the exit access components, including aisles, corridors and egress balconies.

1006.2.1 Occupant Load and Common Path

https://www.youtube.com/watch?v=_WhcoLsLnyk

- Two exits or exit access doorways from any space shall be provided where the design occupant load or the common path of egress travel distance exceeds the values listed in Table 1006.2.1.
- A common path of egress travel is defined as that portion of the exit access travel distance measured from the most remote point within a story to that point where the occupants have separate access to two exits or exit access doorways. The concept of limiting the common path of egress travel addresses the concern that multiple egress options must be available to occupants where the expected egress travel distance becomes excessive. Although the overall travel distance in a building may be of considerable length, such travel is greatly limited where only one egress path is available. An additional limitation due to occupant load is also applied to single exit availability.

1006.2.1 Occupant Load and Common Path

TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A°, E, M	49	75	75	75 ^a
B	49	100	75	100 ^a
F	49	75	75	100 ^a
H-1, H-2, H-3	3	NP	NP	25 ^b
H-4, H-5	10	NP	NP	75 ^b
I-1, I-2 ^d , I-4	10	NP	NP	75 ^a
I-3	10	NP	NP	100 ^a
R-1	10	NP	NP	75 ^a
R-2	20	NP	NP	125 ^a
R-3 ^e	20	NP	NP	125 ^{a, g}
R-4 ^e	20	NP	NP	125 ^{a, g}
S ^f	29	100	75	100 ^a
U	49	100	75	75 ^a

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

- a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where *automatic sprinkler systems* are permitted in accordance with Section 903.3.1.2.
- b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.
- c. For a room or space used for assembly purposes having *fixed seating*, see Section 1029.8.
- d. For the travel distance limitations in Group I-2, see Section 407.4.
- e. The *common path of egress travel distance* shall only apply in a Group R-3 occupancy located in a mixed occupancy building.
- f. The length of *common path of egress travel distance* in a Group S-2 *open parking garage* shall be not more than 100 feet.
- g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

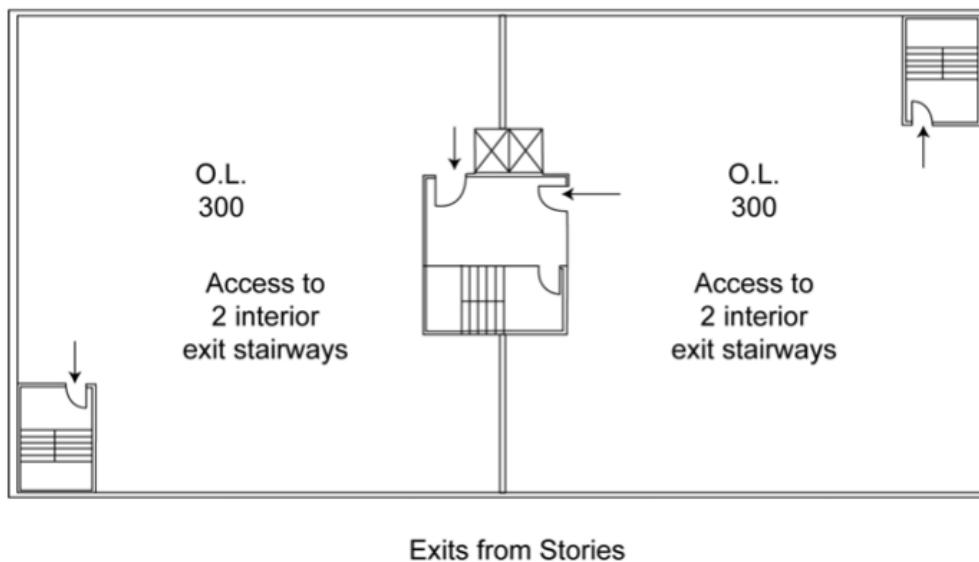
Two basic criteria establish the point at which it is necessary to provide at least two paths of egress travel from a portion of a building. Both the maximum occupant load and the maximum common path must not be exceeded in spaces having only one exit or exit access doorway.

1006.3.2 Based on Occupant Load

TABLE 1006.3.3
MINIMUM NUMBER OF EXITS OR
ACCESS TO EXITS PER STORY

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
More than 1,000	4

Total O.L. = 600
3 exits required from story



Although the use of exit access stairways is permitted to connect stories within a building, the path of egress travel to an exit is limited in a manner such that it cannot pass through more than one adjacent story. There are seven conditions under which such exit access travel to an exit through multiple stories is permitted.

Source: 2021 IBC

1006.3.4 Single Exits

TABLE 1006.3.4(1)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2 ^{a, b}	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for R-2 occupancies consisting of sleeping units. For R-2 occupancies consisting of dwelling units, use Table 1006.3.4(2).

TABLE 1006.3.4(2)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane	A, B ^b , E, F ^b , M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2 ^{a, c}	10	75
	S ^{b, d}	29	75
Second story above grade plane	B, F, M, S ^d	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

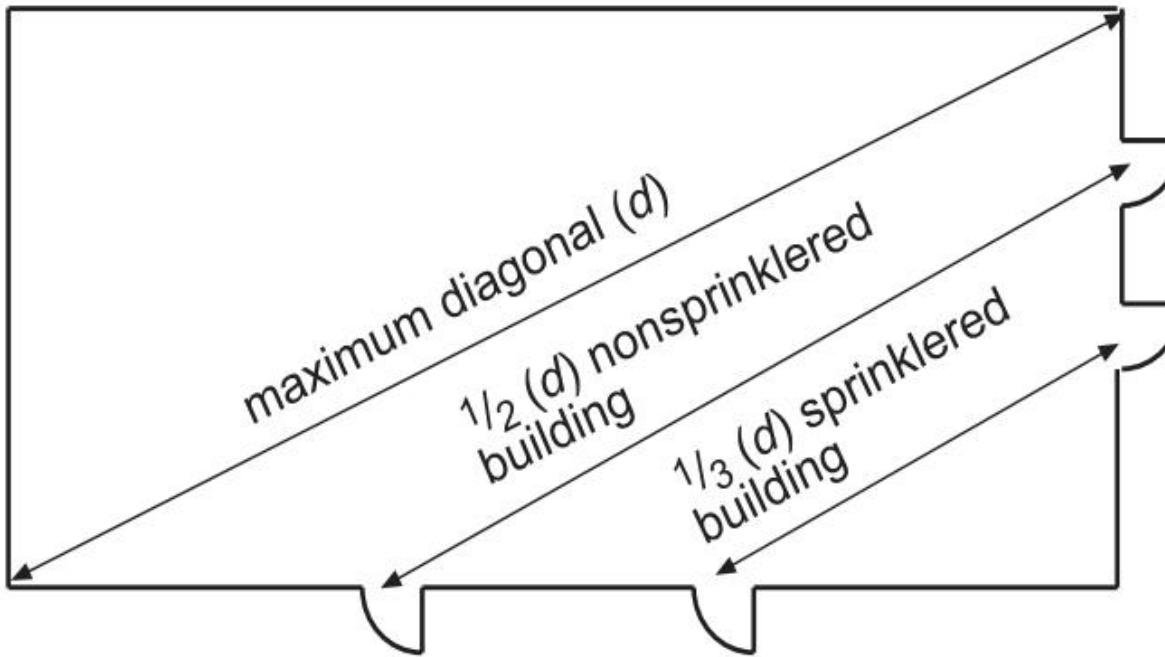
b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum exit access travel distance of 100 feet.

c. This table is used for R-2 occupancies consisting of sleeping units. For R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

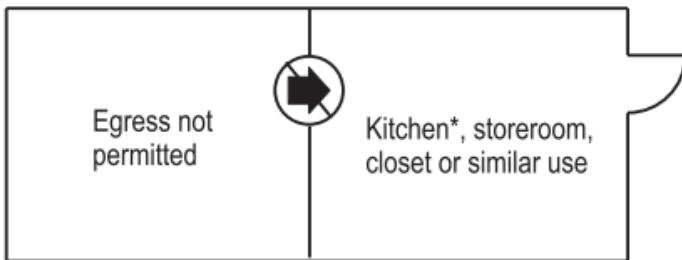
Table 1006.3.4(1) is only applicable to Group R-2 occupancies containing dwelling units and allows a single exit from the basement, as well as the first, second and third stories under limited conditions. Table 1006.3.4(2) applies to all other occupancy groups and does not permit a single exit from the third story where serving such occupancies.

1007.1.1 Doorway Arrangement

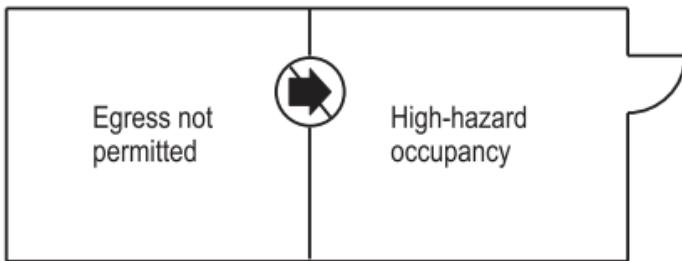


Where more than two exit access doorways are required, they should be situated at reasonable distances from one another so that if one doorway becomes blocked, the others will be available. The use of common sense should dictate the proper separation based on the design and use of the space or room.

1016.2, Item 2 Egress through Intervening Spaces



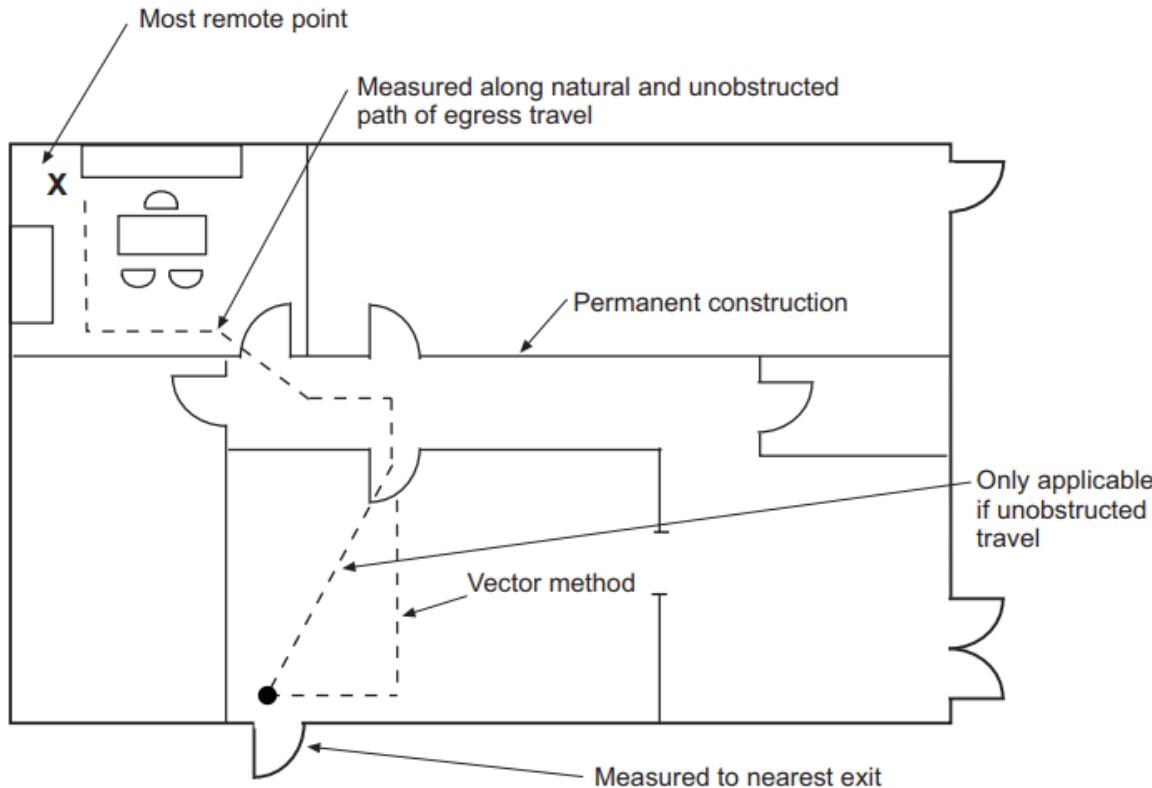
*** Exception**
Kitchen within same dwelling unit or guestroom



Exception
When space to be entered is the same occupancy group

Similar to an accessible route of travel, egress is limited in that it cannot pass through kitchens, store rooms, closets or spaces used for similar purposes. These types of spaces have a high probability of blocked access and egress, due to obstructions created by the use of the space. A dedicated path created by partial or full-height walls is permitted where exiting through a stockroom serving a Group M occupancy.

1017.2, 1017.3 Travel Distance Limitations



In most sprinklered buildings, the code permits a moderate increase in the permitted travel distance over that permitted in nonsprinklered buildings. An increase of 50 feet is typical of most occupancies; however, a travel distance increase of 100 feet is permitted for Group B occupancies protected by a sprinkler system.

1017.2, 1017.3 Travel Distance Limitations

TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE^a

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200 ^e	250 ^b
I-1	Not Permitted	250 ^b
B	200	300 ^c
F-2, S-2, U	300	400 ^c
H-1	Not Permitted	75 ^d
H-2	Not Permitted	100 ^d
H-3	Not Permitted	150 ^d
H-4	Not Permitted	175 ^d
H-5	Not Permitted	200 ^c
I-2, I-3	Not Permitted	200 ^c
I-4	150	200 ^c

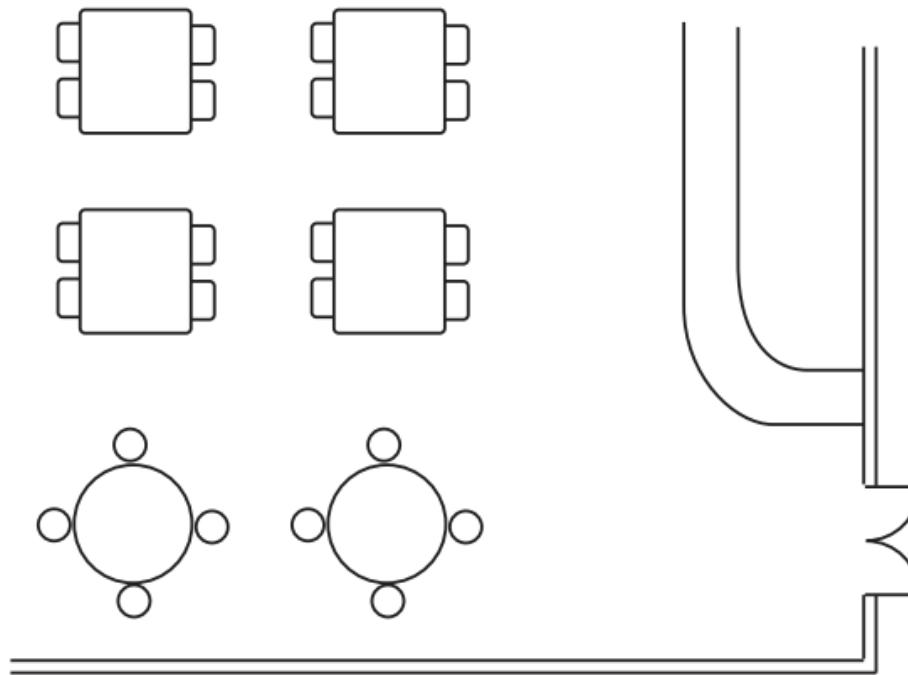
For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to *exit access* travel distance requirements:

- Section 402.8: For the distance limitation in malls.
- Section 407.4: For the distance limitation in Group I-2.
- Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
- Section 411.2: For the distance limitation in special amusement areas.
- Section 412.6: For the distance limitations in aircraft manufacturing facilities.
- Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
- Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
- Section 1006.3.4: For buildings with one exit.
- Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
- Section 1030.7: For increased limitation in assembly seating.
- Section 3103.4: For temporary structures.
- Section 3104.9: For pedestrian walkways.
- b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.
- c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.
- e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

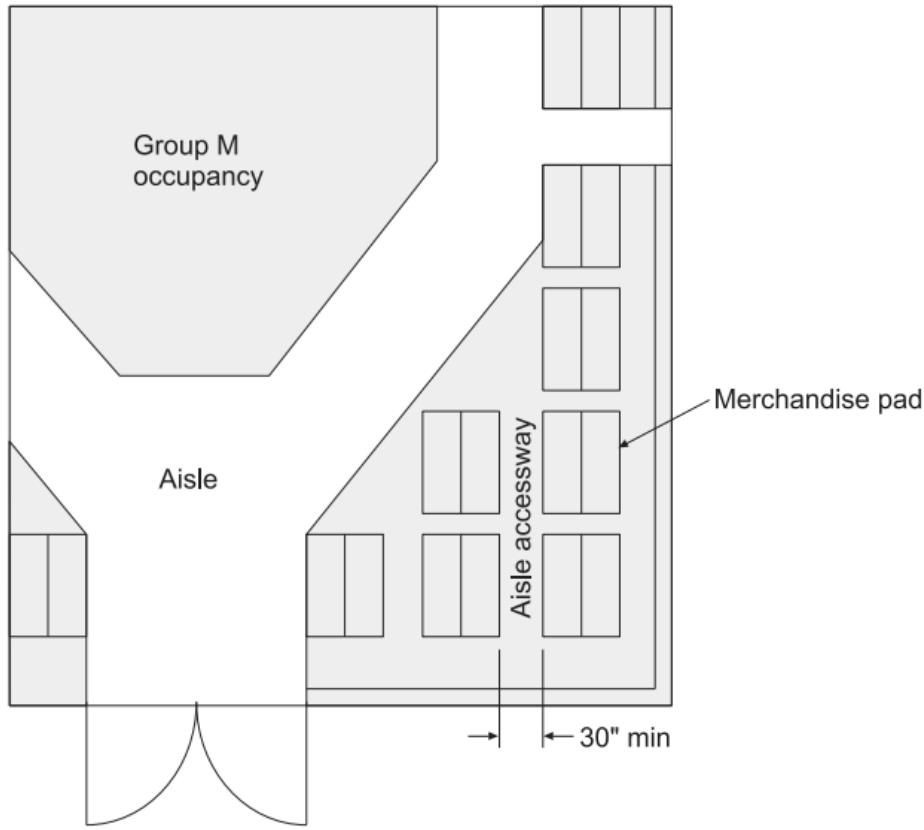
As an example, where an exit access stairway is provided as a sole means of egress from a mezzanine, the travel distance would be measured from the most remote point on the mezzanine, down the stairway and continue until reaching the entrance to the nearest exit.

1018.1 Aisles



At least 28 inches of egress width are required for nonpublic aisles not required to be accessible, provided they serve less than 50 persons.

1018.4 Aisles Accessway in Group M



For SI: 1 inch = 25.4 mm

Within a merchandise pad, the common path of travel is limited to 75 feet in length. Where the occupant load of the area served by the common path exceeds 50 persons, the common path cannot exceed 30 feet in length from any point in the merchandise pad.

Source: 2021 IBC

1020.1 Corridor Construction

[Corridor Inspection - YouTube](#)

- Corridors shall be fire-resistance rated in accordance with Table 1020.2. The corridor walls required to be fire-resistance rated shall comply with Section 708 for fire partitions. See the five exceptions where a rating is not required.
- A fire-resistance-rated corridor is intended to protect occupants of the corridor during egress travel from an incident in an enclosed space bordering the corridor. The construction of the corridor provides a minimum level of protection from fire and smoke through the use of fire-resistance-rated walls and ceilings, as well as fire-protected openings. Smoke infiltration is limited also by smoke- and draft-control door assemblies and smoke dampers. Occupancy group, occupant load and presence of a fire sprinkler system are the major factors in determining whether or not a corridor must have a fire-resistance rating.

1020.1 Corridor Construction

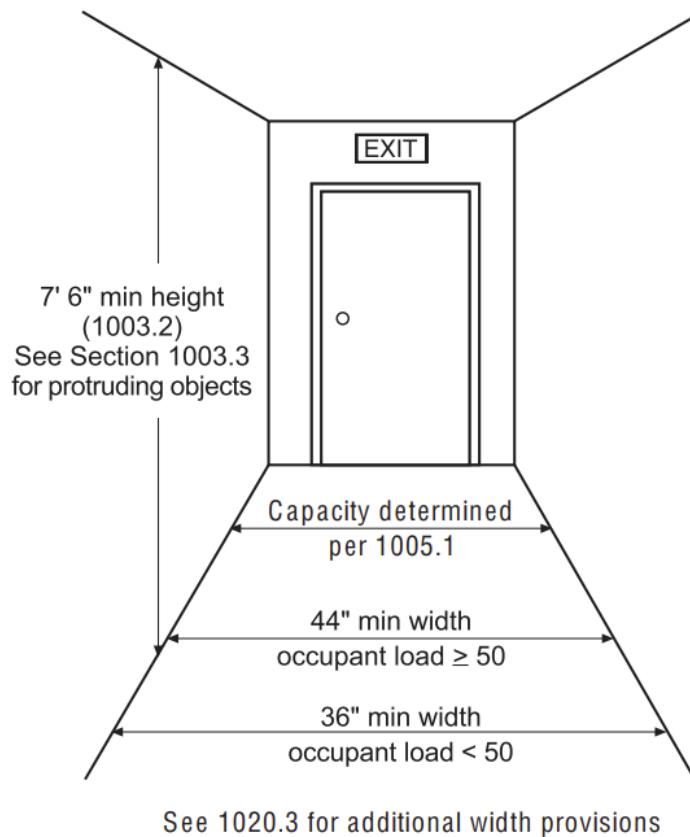
**TABLE 1020.2
CORRIDOR FIRE-RESISTANCE RATING**

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system
H-1, H-2, H-3	All	Not Permitted	1 ^c
H-4, H-5	Greater than 30	Not Permitted	1 ^c
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5 ^c /1 ^d
I-2 ^a	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1 ^{b, c}
I-4	All	1	0

- a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.
- b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.
- c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.
- d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

Exceptions eliminate the need for a fire-resistance-rated corridor in certain Group E occupancies, in sleeping units or dwelling units of residential occupancies, in open parking garages and in Group B occupancies that are permitted a single means of egress by Section 1006.2.

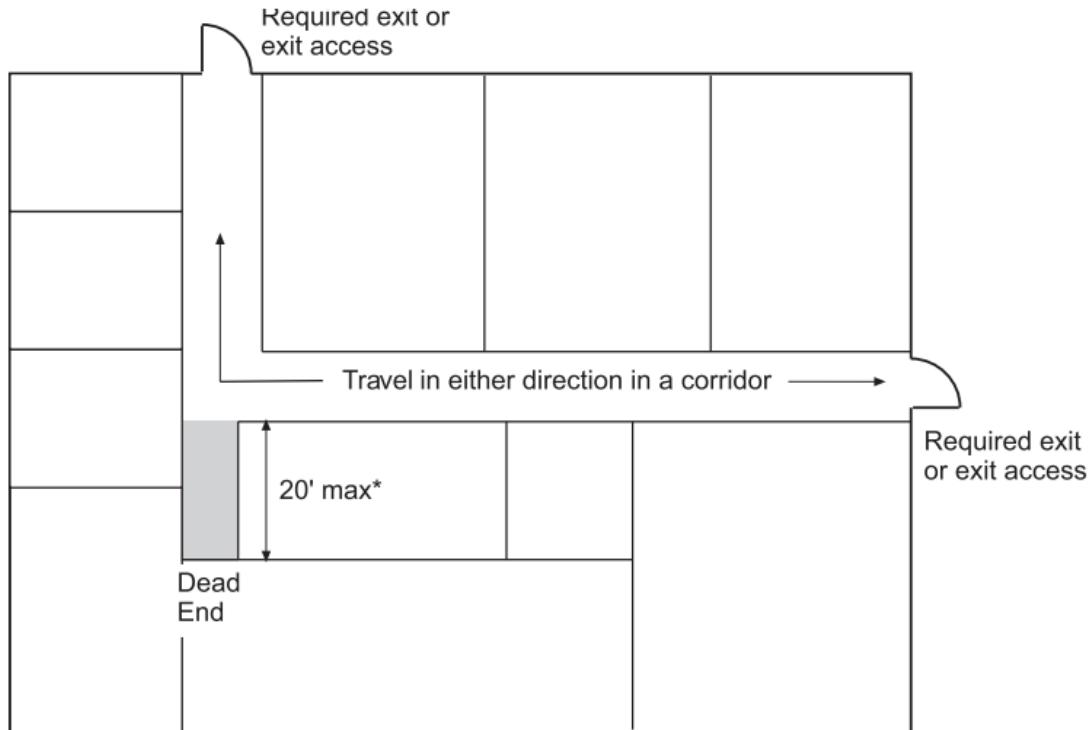
1020.3 Corridors: Width and Capacity



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Certain occupancies require additional corridor widths based on their specialized uses. Corridors serving 100 or more occupants in Group E educational occupancies must be at least 72 inches in width, and healthcare occupancies require increased widths for bed movement.

1020.3 Corridors: Means of Egress



* 50 ft max in sprinklered Group B, E, F, I-1, M, R-1, R-2, R-4, 5 and U occupancies

* Up to 2.5 times the least corridor width

* 50 ft max in I-3 Conditions 2, 3 or 4

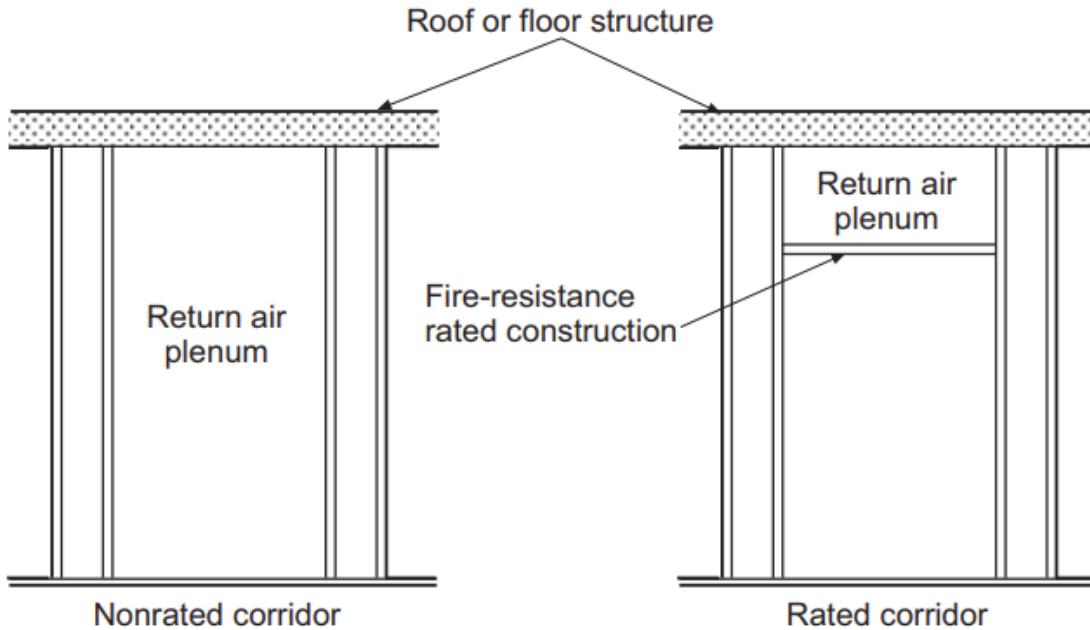
* 30 ft max in Group I-2, Condition 2 corridors that do not serve patient rooms or treatment spaces

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Once a building occupant enters a corridor during emergency egress conditions, there is an expectation that a direct and obvious exit path is available. Dead-end configurations should be minimal, if not eliminated, to expedite the exiting process.

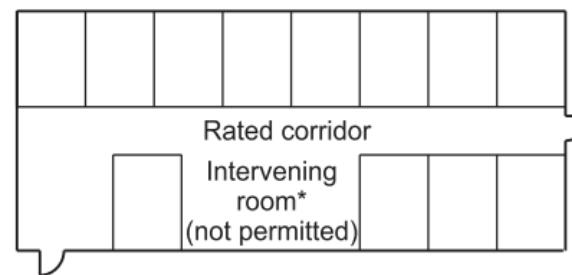
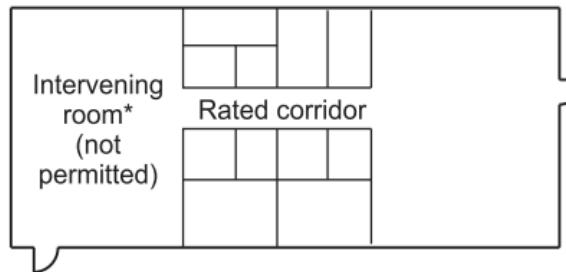
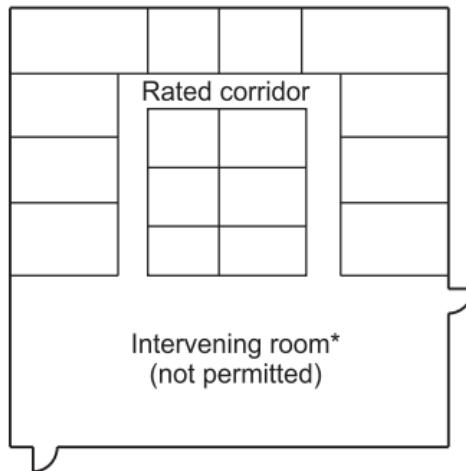
1020.6, 1020.6.1 Air Movement in Corridors: Means of Egress

[AC 014 - The Best IBC Chapter 10 Overview Ever! \(In 10 minutes\) - YouTube](#)



Where a corridor is directly supplied with outdoor air, make-up air for exhaust systems in rooms that open directly into a corridor may be taken from the corridor. The rate at which outdoor air is supplied to the corridor must exceed the rate of makeup air taken from the corridor.

1020.7 Corridors Continuity



* Foyers, lobbies or reception areas that are constructed as corridors are not considered intervening rooms

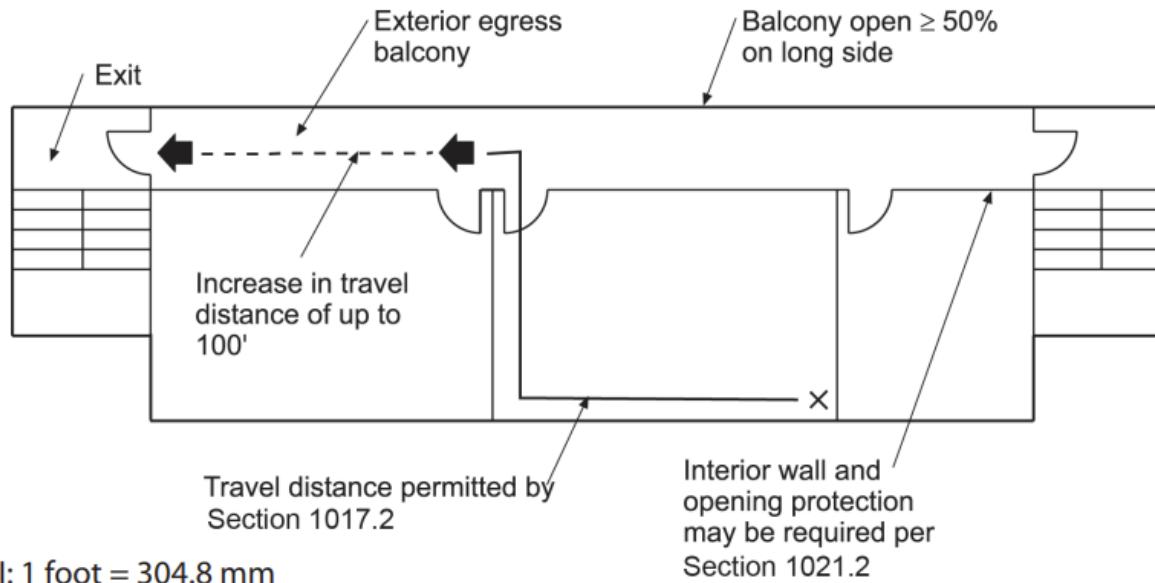
Where the path of travel occurs in a corridor not required to be fire-resistance-rated, such travel may then proceed through other intervening spaces, provided all other requirements of the code are met, such as those for common path of egress travel and travel distance.

Topic: Egress Balconies

Reference: IBC 1021

Category: Means of Egress

Subject: Exit Access



For an exit access element to be considered an egress balcony, it must be sufficiently open to the exterior to minimize the potential for smoke and toxic gases to accumulate. The code considers openings for at least 50 percent of the long side to be adequately open.

Source: 2021 IBC

2021 IBC Sections 1022 through 1031

Means of Egress IV

OBJECTIVE: To obtain an understanding of the provisions governing the exit and exit discharge portions of the means of egress, the special requirements applicable to egress from assembly occupancies, and the details for emergency escape and rescue openings.

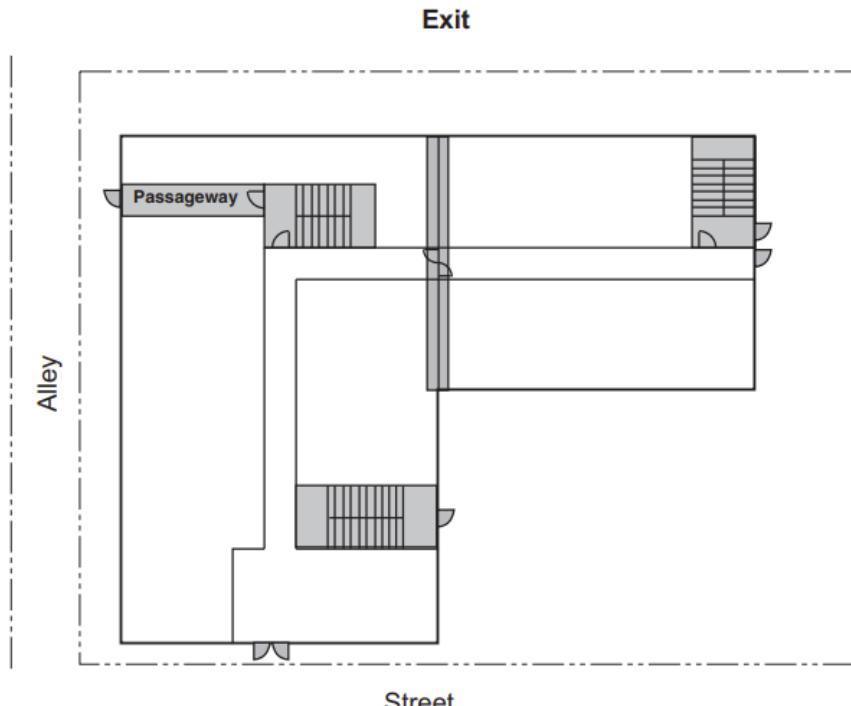
Topic: Definition

Reference: IBC 1022, 202

Category: Means of Egress

Subject: Exits

[What is an exit? - YouTube](#)



Because an exit must be maintained for egress, it cannot be used for any purpose that interferes with egress. In addition, once a mandated level of protection is provided for occupants reaching an exit, that level cannot be diminished prior to their reaching the exit discharge.

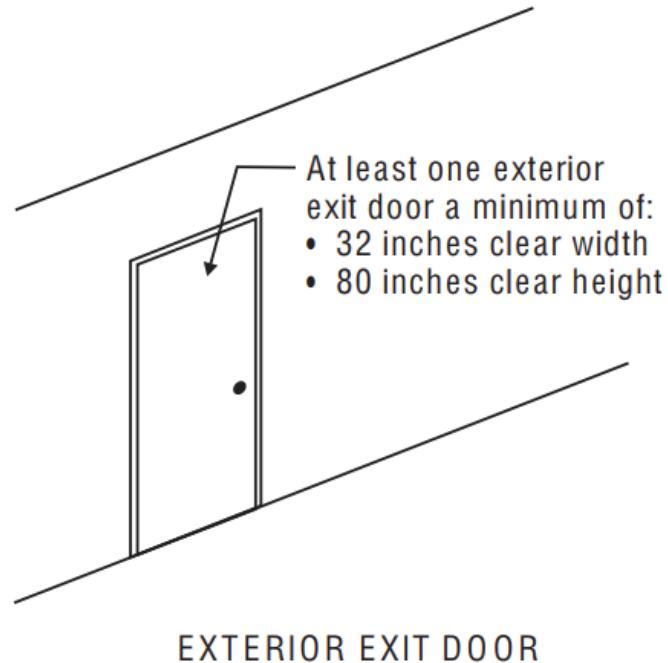
Source: 2021 IBC

Topic: General Provisions

Reference: IBC 1022.1, 1022.2

Category: Means of Egress

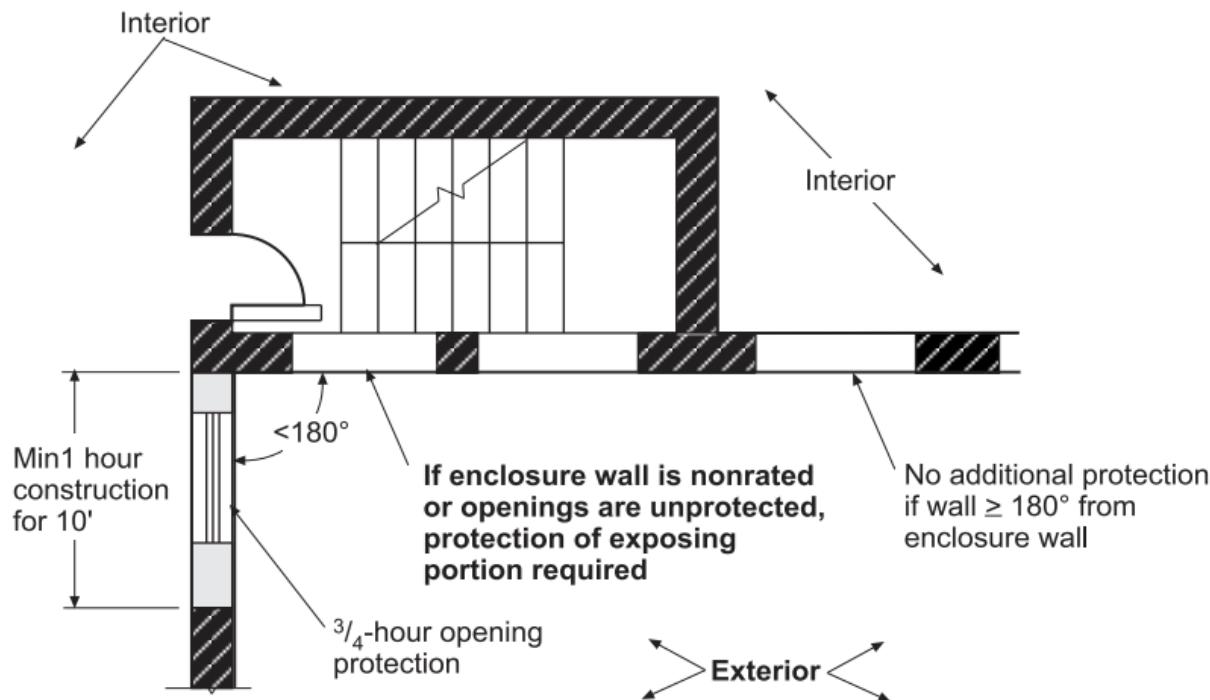
Subject: Exits



All buildings, regardless of size, that are intended for human occupancy must have a minimum of one exit door that meets the minimum width and height requirements of Section 1010.1.1. The intent of this provision is to override any exceptions for minimum door width and height that may apply in other locations throughout the building.



Interior exit stairways and ramps must always be enclosed with fire-resistance-rated construction. Allowances for unenclosed stairways within the means of egress are established in Section 1019 under the provisions for exit access stairways.

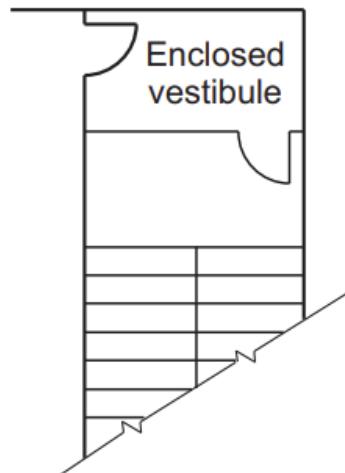


For SI: 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

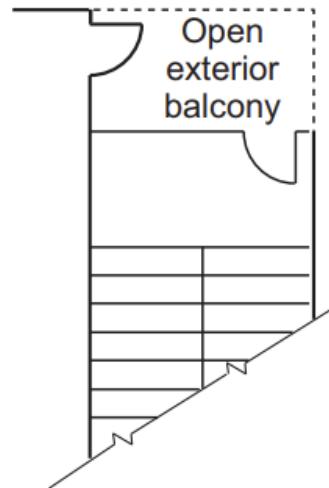
An alternative to the protection of exterior walls adjacent to an interior exit stairway or ramp is the protection of the exterior wall of the enclosure itself. Should a fire breach an adjacent exterior wall, its penetration of the stairway or ramp enclosure would be halted for an acceptable time period.

[How Mechanical Smoke Ventilation Systems Work - YouTube](#)

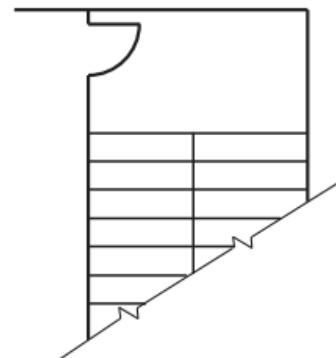
Smokeproof enclosures



Mechanical ventilation alternative

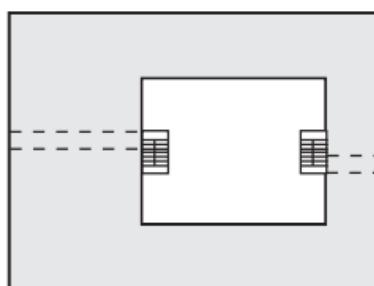
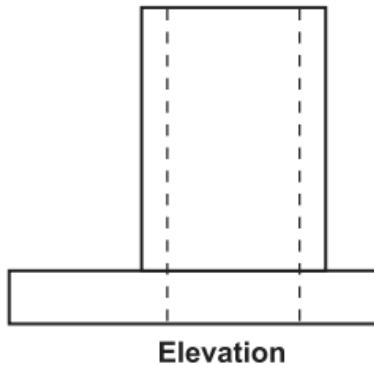


Natural ventilation alternative



Stair pressurization alternative

If a smokeproof enclosure does not exit directly to a yard, court or public way, then an exit passageway must be provided to extend protected travel to the exterior. The exit passageway may have no other openings unless it is protected in the same manner as the vertical enclosure.



Enclosure construction:

- Four or more stories—2-hour fire resistance
- Less than four stories—1-hour fire resistance

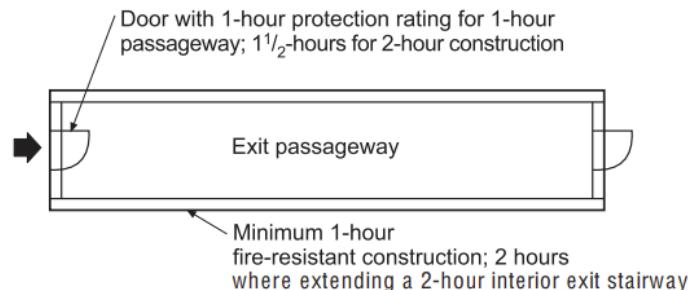
Openings and penetrations:

- Permitted exterior openings (705)
- Egress from normally occupied spaces
- Egress from enclosure
- Fire protection systems
- Ductwork for independent pressurization
- Limited electrical conduit
- Security systems
- Two-way communication systems
- Structural elements supporting stairway or enclosure

Doors: (716)

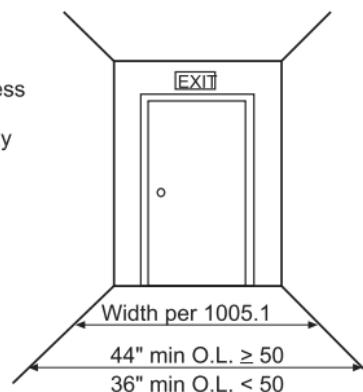
- Self-closing or automatic closing
- 1-hour rating in 1-hour construction
- 1½-hour rating in 2-hour construction
- Temperature rise limit of 450°F above ambient

Several methods are set forth in the code to provide for ventilation of an exit enclosure. In general, penetrations for ductwork must enter directly from the building's exterior or from an interior space separated from the remainder of the building by a shaft enclosure.



- Openings limited to those necessary for egress
- Elevators shall not open into exit passageway
- Penetrations not permitted except for those serving the exit passageway

For SI: 1 inch = 25.4 mm.

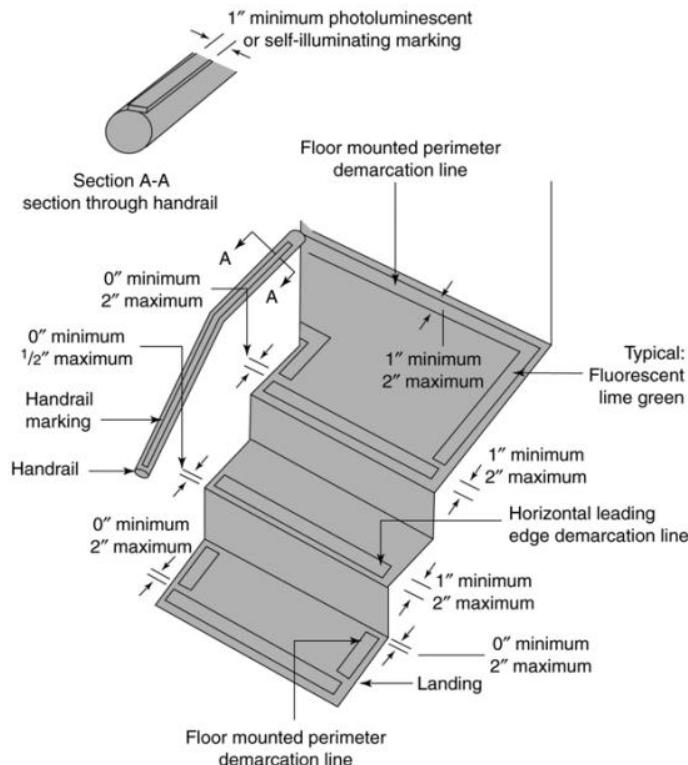


[AC 049 - Corridors Vs. Exit Passageways \(with corrected audio\) - YouTube](#)

Once in an exit passageway, the building occupant is considered to be in a relatively safe location; thus, travel distances within the exit passageway are unregulated. Simply put, an exit passageway is a horizontal exit enclosure, with conditions and limitations similar to those required for an interior exit stairway.

Topic: General Provisions
Reference: IBC 1025.1

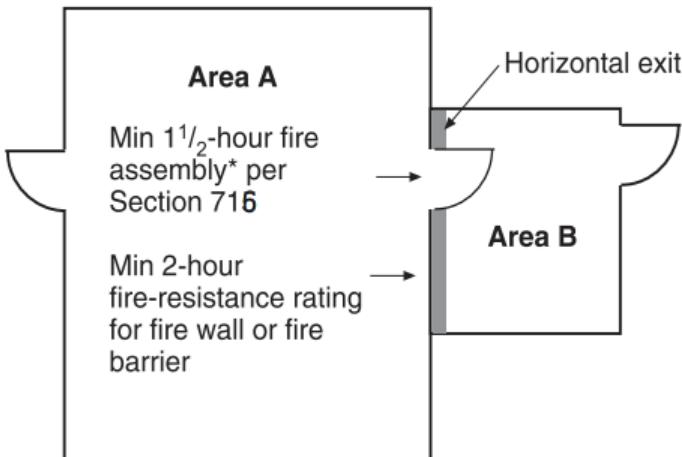
Category: Means of Egress
Subject: Luminous Egress Path Markings



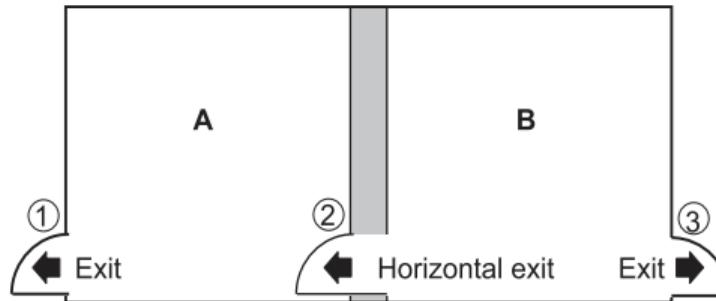
Note: The width of demarcation lines at horizontal leading edges of stairs, perimeter demarcation line and handrails may be less than 1" width when listed in accordance UL 1944.

Analogous to rechargeable batteries, many photoluminescent and self-illuminating egress path markings require exposure to light to perform properly. Thus, such markings must be exposed to a minimum of 1 foot-candle of light energy at the walking surface for at least 60 minutes prior to the building being occupied.

[Ecoglo Photoluminescent Safety Products - YouTube](#)



* must be self-closing or automatic closing upon activation of a smoke detector



NOTE: Exit for "A" adequate to meet the provisions of Chapter 10 but need not include added capacity imposed by occupants entering through horizontal exit from "B."

Horizontal exits must extend vertically through all levels of the building, unless minimum 2-hour floor assemblies with no unprotected openings are provided. The horizontal exit walls are to extend continuously from exterior wall to exterior wall in order to completely divide the floor.

Topic: Open Side

Reference: IBC 1027.3

Category: Means of Egress

Subject: Exterior Exit Ramps and Stairways

Code Text: *Exterior exit stairways and ramps serving as an element of a required means of egress shall be open on not less than one side. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.*

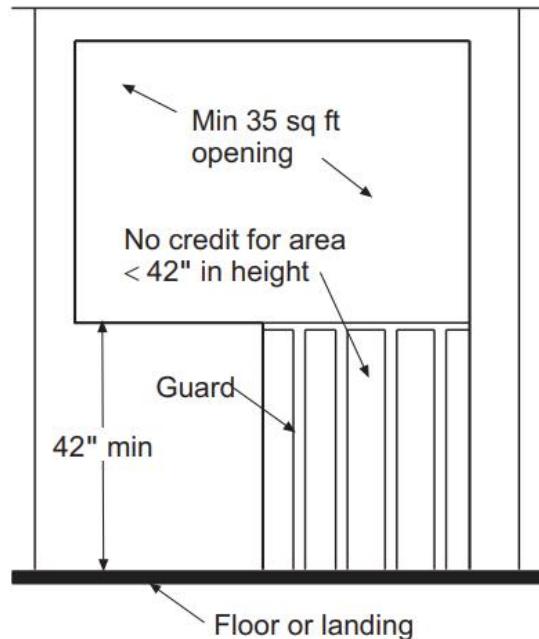
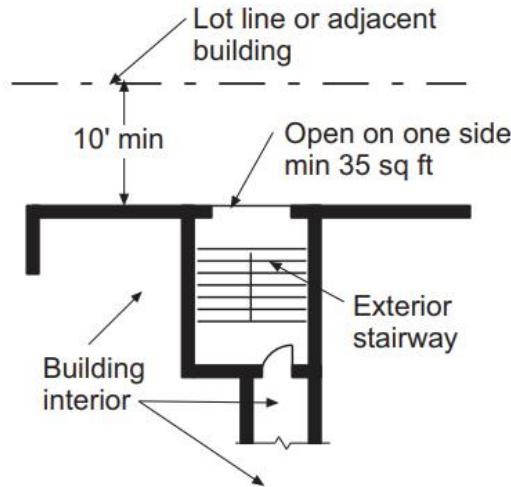
Discussion and Commentary: For a stairway or ramp to be considered exterior, it must be open enough to the outside so that smoke and toxic gases will not tend to corrupt the exit route. An exterior exit ramp or exterior exit stairway is considered an exit component and is permitted as an egress element in all occupancies except Group I-2. Where permitted as an element of a required means of egress, an exterior exit stairway is limited to buildings with a maximum of 6 stories and no more than 75 feet in height above the lowest level of fire department vehicle access.

Topic: Open Side

Reference: IBC 1027.3

Category: Means of Egress

Subject: Exterior Exit Ramps and Stairways



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.093 m².

Consistent with the requirements for other exit components, an exterior exit ramp or stairway must be separated from the remainder of the building by fire-resistance-rated construction and protected openings. The IBC provides four exceptions where separation is not warranted.

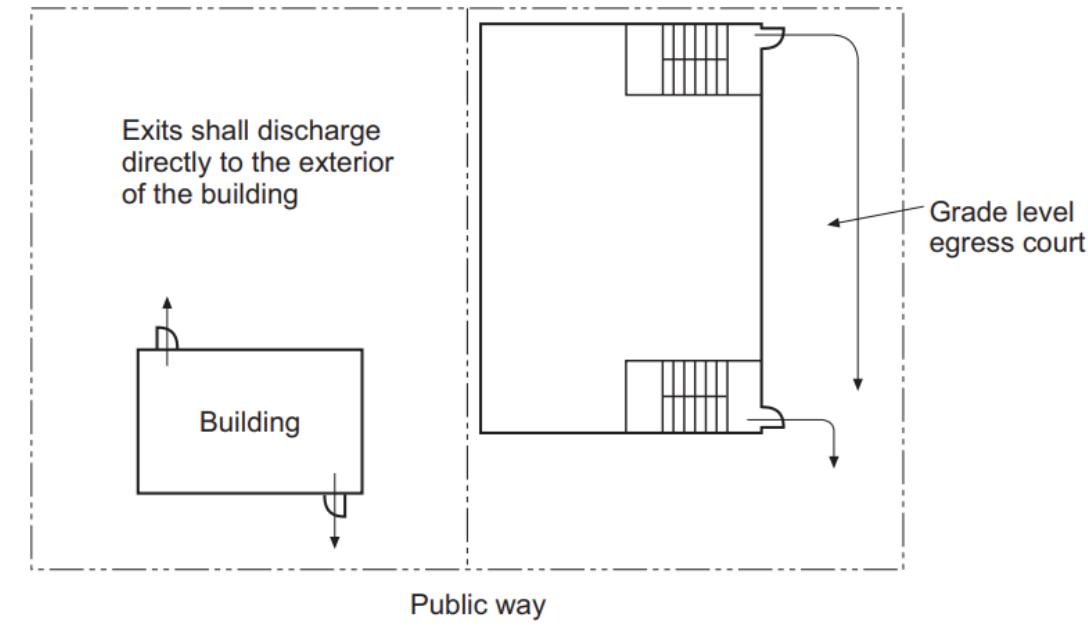
Source: 2021 IBC

Topic: Definition and Scope

Category: Means of Egress

Reference: IBC 1028.2, 1028.4, 202

Subject: Exit Discharge



Number of exits maintained until arrival at grade or public way

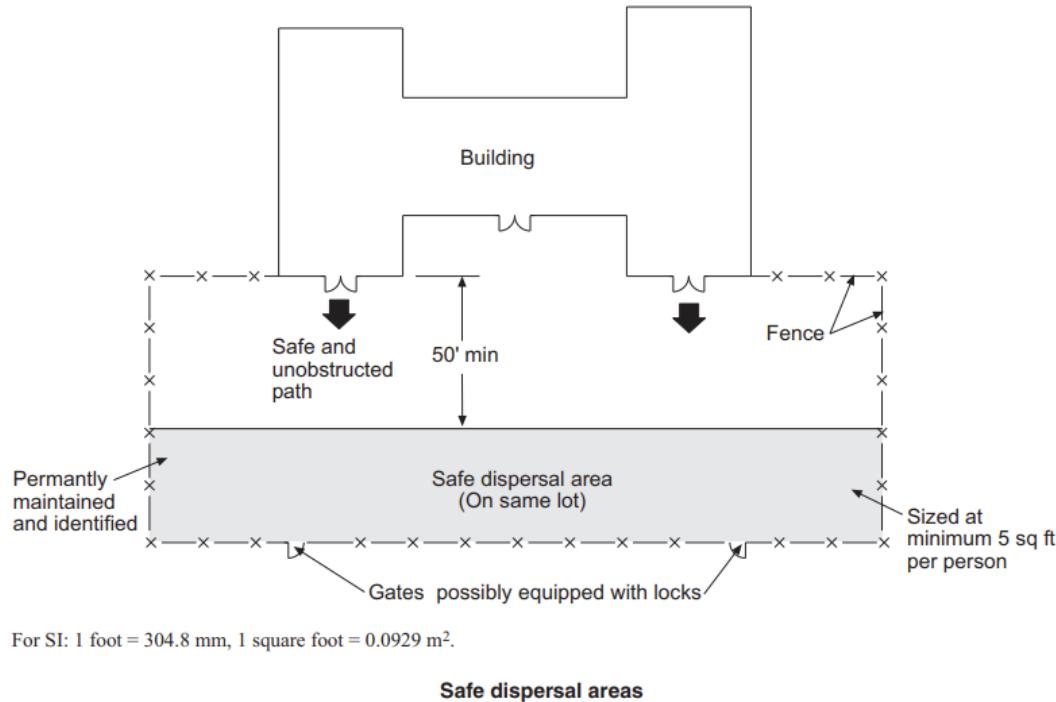
When specific conditions are met, up to 50 percent of the number and capacity of interior exit stairways may exit through a vestibule or an area on the discharge level, provided all the stated conditions have been met.

Topic: Access to a Public Way

Reference: IBC 1028.5

Category: Means of Egress

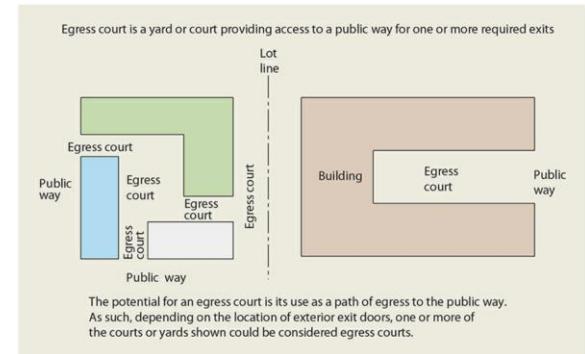
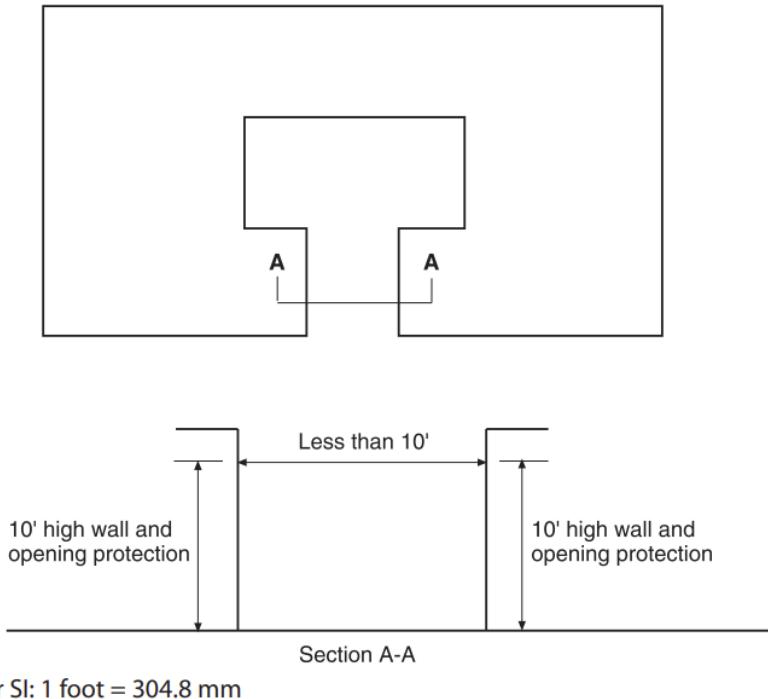
Subject: Exit Discharge



Occasionally it is impractical, and at times impossible, to provide a fully complying means of egress the entire distance to the public way. A safe dispersal area can be utilized where such conditions exist, such as on large industrial or educational campus sites.

Topic: Egress Courts
Reference: IBC 1029.3

Category: Means of Egress
Subject: Exit Discharge



The minimum required width of an egress court is addressed in a manner similar to that of aisles, corridors and stairways. The width must accommodate the calculated capacity, based on occupant load served; however, in no case may it be less than a specified width of 44" (36" in Group R-3).

Source: 2021 IBC

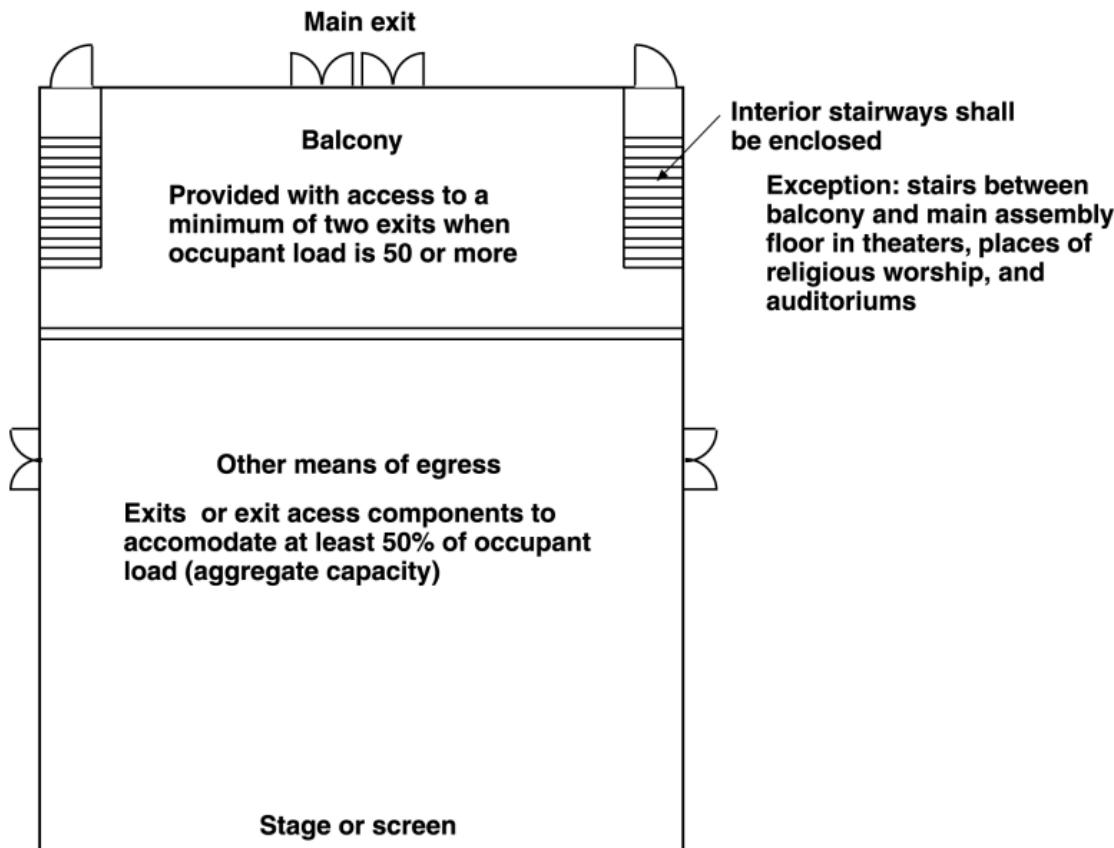
Topic: Assembly Main Exit

Reference: IBC 1030.2

Category: Means of Egress

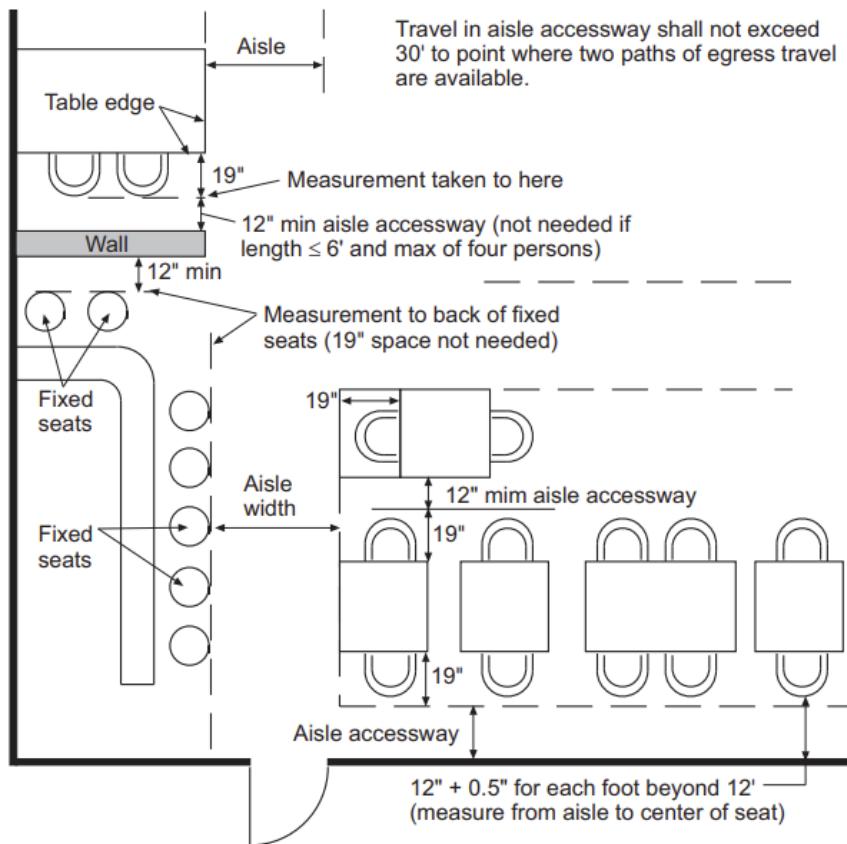
Subject: Assembly Seating

**Main exit to accommodate at least 50% of occupant load
(not less than total required capacity of all egress components leading to exit)**



To better define and maintain the egress path through a lobby or foyer to the main entrance/exit in a Group A-1 occupancy, the code mandates that the waiting area not encroach upon the required clear egress width.

Source: 2021 IBC

Topic: Seating at Tables**Reference:** IBC 1030.13.1.1, 1030.13.1.2**Category:** Means of Egress
Subject: Exit Access

For SI: 1 inch = 25.4 mm.

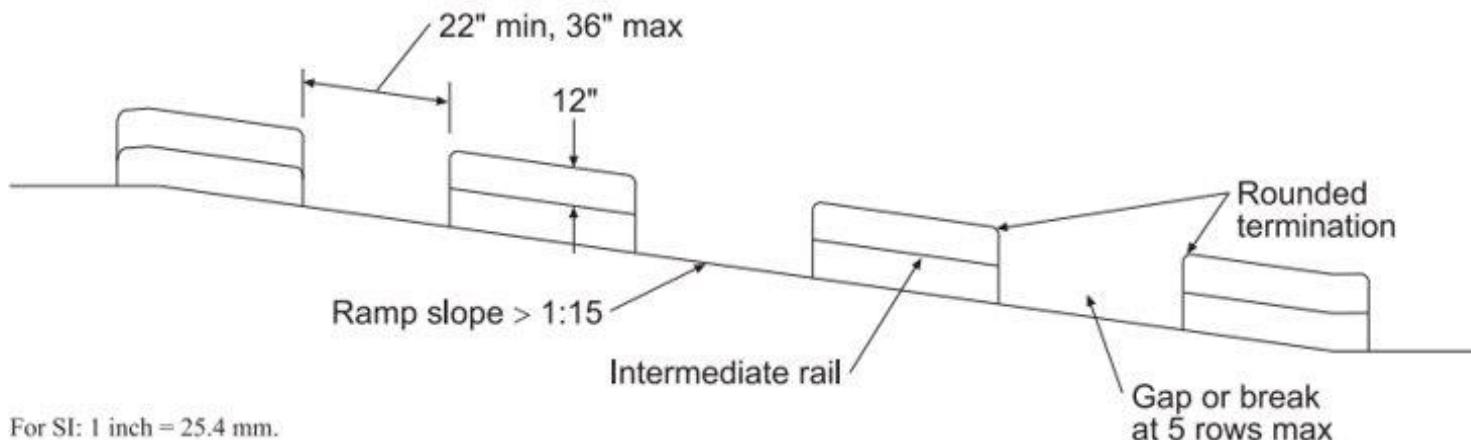
The method of determining the clear width differs based on the type of seating that is provided. For fixed seats, the measurement is made from the back of the seats. Otherwise, the clear width is measured to a line 19 inches from the edge of the table or counter.

Topic: Handrails

Reference: IBC 1030.16

Category: Means of Egress

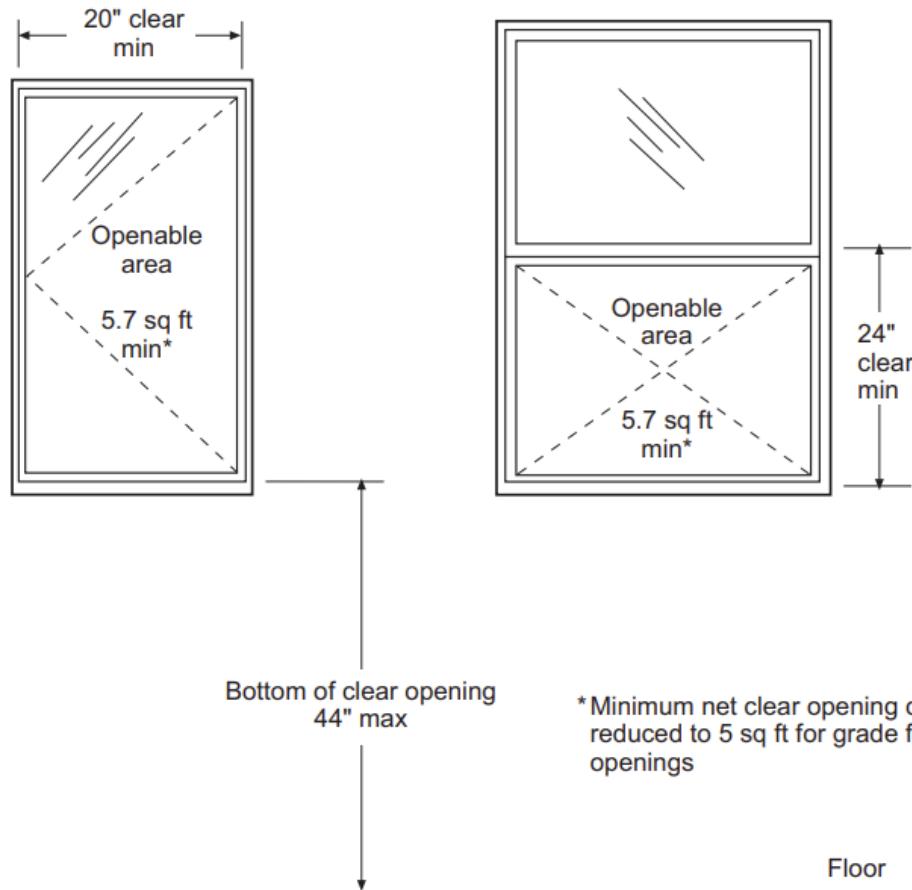
Subject: Assembly Seating



Where discontinuous handrails are provided, an intermediate handrail located 12 inches below the main handrail is required to prevent users from ducking under the handrail and hindering flow. It also provides a handrail for toddlers who may be using the aisle.

Topic: Required Openings
Reference: IBC 1031

Category: Means of Egress
Subject: Emergency Escape and Rescue



For SI: 1 square foot = 0.093 m², 1 inch = 25.4 mm.

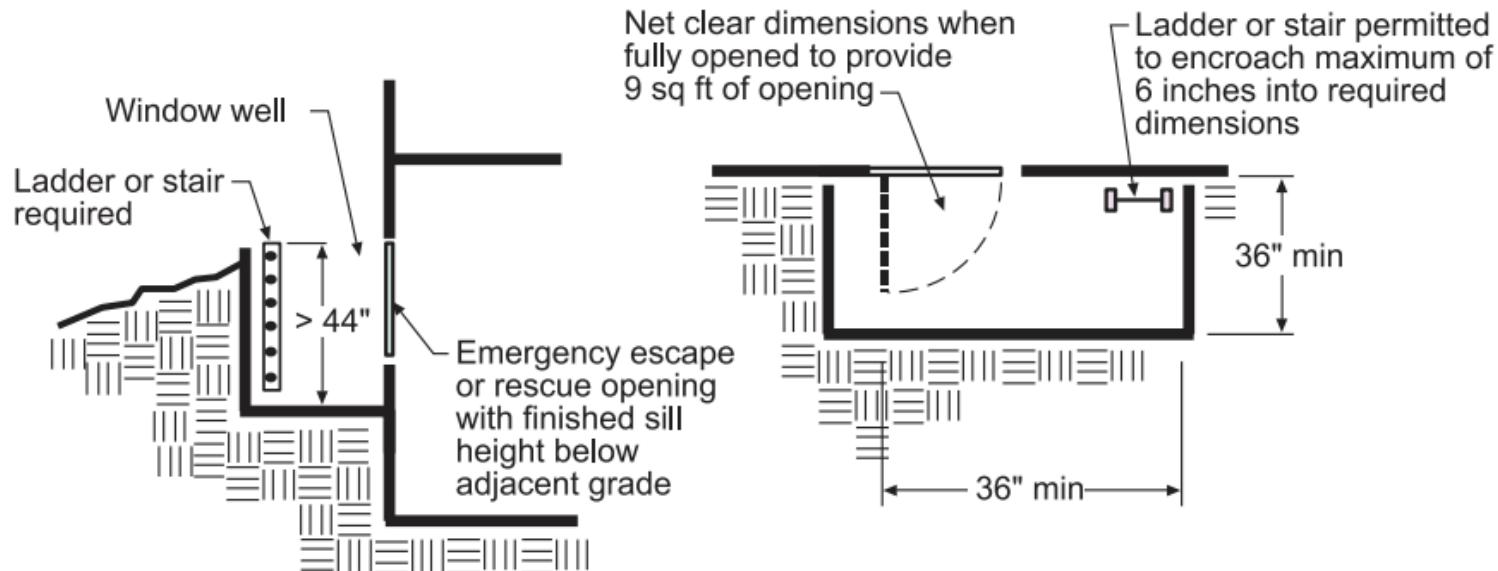
[Egress Windows For Fire Safety | What Are They? Where Are They Needed? - YouTube](#)

When operable windows are used for egress or rescue purposes, the intent is that they be double-hung, horizontal sliding or casement styles operated by a simple operation. Special types other than those listed must be evaluated for compliance with the operational constraint limitations.

Source: 2021 IBC

Topic: Window Wells
Reference: IBC 1031.4

Category: Means of Egress
Subject: Emergency Escape and Rescue



For SI: 1 inch = 25.4 mm, 1 square foot = 0.093 m².

Window well ladders must have a minimum clear rung width of 12 inches with the rungs spaced at maximum 18-inch intervals vertically. The ladder or steps cannot encroach into the required dimensions of the window well more than 6 inches.

Class 12: Chapters 8, 12, 25 and 30—Interior Finishes, Interior Environment, Gypsum Board and Elevators

Source: 2021 IBC

Objective

- To gain an understanding of the limitations on interior wall and ceiling finishes; the installation requirements for gypsum board, lath and plaster; the important issues concerning the interior environment, including light, ventilation and sound transmission, and the provisions for elevators and their hoistways.

Topic: Definition and Classifications

Reference: IBC 802.1, 202

Category: Interior Finishes

Subject: Wall and Ceiling Finishes

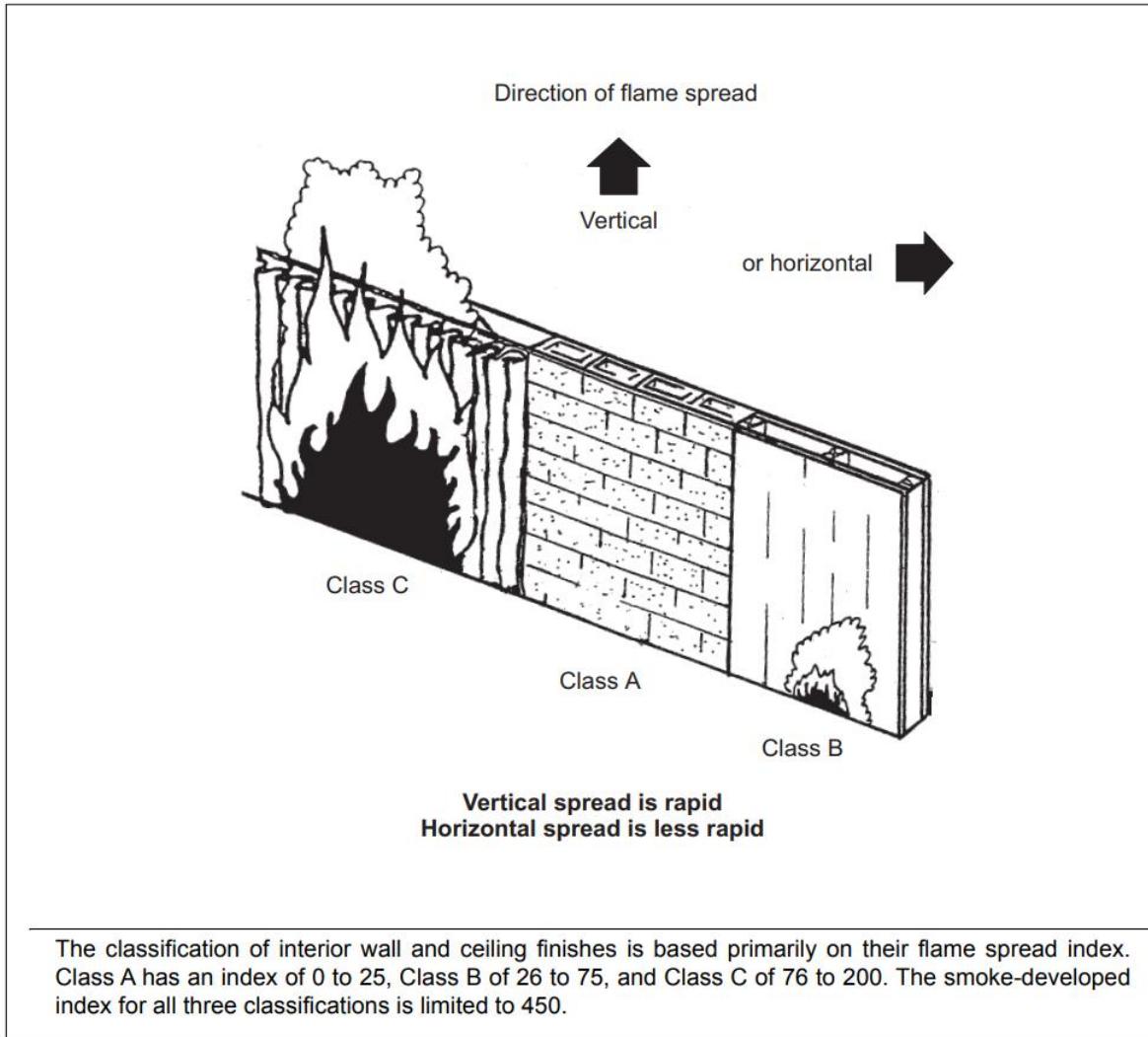
Code Text: *The provisions of Section 803 shall limit the allowable fire performance and smoke development of interior wall and ceiling finish materials based upon occupancy classification. Interior wall and ceiling finish includes the exposed interior surfaces of buildings including, but not limited to: fixed or movable walls and partitions; toilet room privacy partitions; columns; ceilings; and interior wainscotting, paneling, or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including trim.*

Discussion and Commentary: It is the intent of the IBC to govern those materials applied to walls or ceilings that could contribute to the spread of flame or the development of smoke. Floor finishes are regulated in a different manner as set forth in Section 804.

[IBC Chapter 8: Interior Finishes - 2022 NSBAIDRD Seminar Session 4 - YouTube](#)

Topic: Definition and Classifications
Reference: IBC 802.1, 202

Category: Interior Finishes
Subject: Wall and Ceiling Finishes



Topic: Flame-Spread Classification

Category: Interior Finishes

Reference: IBC 803.13

Subject: Finish Requirements by Occupancy

Code Text: *Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.13 for the group and location designated.*

Discussion and Commentary: Based on fire statistics, the rapid spread of fire across an interior finish material has been second only to vertical fire spread through openings between floors as a cause of life loss during building fires. Therefore, limitations are placed on the materials that are used to cover the walls and ceilings of rooms and other enclosed spaces, corridors, and vertical exits and exit passageways. The rapid spread of fire and the increased contribution of fuel to the fire are the major reasons why finish materials must meet stringent criteria to gain acceptance.

[Ceiling Tiles & Panels | Rockfon](#)

Topic: Flame-Spread Classification
Reference: IBC 803.13

Category: Interior Finishes
Subject: Finish Requirements by Occupancy

TABLE 803.13
 INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY^k

GROUP	SPRINKLERED ⁱ			NONSPRINKLERED		
	Interior exit stairways and ramps and exit passageways ^{a, b}	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces ^c	Interior exit stairways and ramps and exit passageways ^{a, b}	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces ^c
A-1 & A-2	B	B	C	A	A ^d	B ^e
A-3 ^f , A-4, A-5	B	B	C	A	A ^d	C
B, E, M, R-1	B	C ^m	C	A	B	C
R-4	B	C	C	A	B	B
F	C	C	C	B	C	C
H	B	B	C ^g	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B ^{h, i}	A	A	B
I-3	A	A ^j	C	A	A	B
I-4	B	B	B ^{h, i}	A	A	B
R-2	C	C	C	B	B	C
R-3	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No restrictions			No restrictions		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m².

- a. Class C interior finish materials shall be permitted for wainscoting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.15.1.
- b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.
- c. Requirements for rooms and enclosed spaces shall be based on spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered to be enclosing spaces and the rooms or spaces on both sides shall be considered to be one room or space. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.
- d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall be not less than Class B materials.
- e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.
- f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.
- g. Class B material is required where the building exceeds two stories.
- h. Class C interior finish materials shall be permitted in administrative spaces.
- i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.
- j. Class B materials shall be permitted as wainscoting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.
- k. Finish materials as provided for in other sections of this code.
- l. Applies when protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
- m. Corridors in ambulatory care facilities shall be provided with Class A or B materials.

Textile materials, where applied to walls or ceilings, must meet additional criteria prior to approval. Finishes that have napped, tufted, looped, nonwoven, woven or similar surface characteristics present a unique hazard on account of their contribution to extremely rapid fire spread.

Topic: Floor Finish Requirements
Reference: IBC 804.4.2

Category: Interior Finishes
Subject: Interior Floor Finish

Code Text: *In all occupancies, interior floor finish and floor covering materials in enclosures for stairways and ramps, exit passageways, corridors and rooms or spaces not separated from corridors by partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux not less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2 and S. See the exception for the permitted reduction of classification in fully sprinklered buildings.*

Discussion and Commentary: Although there are many different types of floor finishes and floor coverings, only those flooring materials composed of fibers are regulated by Section 804. Where required to be classified as Class I or Class II materials, the floor covering materials must be tested by an approved agency in accordance with NFPA 253 or ASTM E648. In order to verify compliance, the materials must be identified by a hang tag or other suitable method that identifies the manufacturer or supplier, style and finish classification.

Topic: Floor Finish Requirements
Reference: IBC 804.4.2

Category: Interior Finishes
Subject: Interior Floor Finish

Types of classifications: (in terms of heat flux, Sec. 804.2)

- Class I: Minimum 0.45 watts/cm² per NFPA 253 or ASTM E648
- Class II: Minimum 0.22 watts/cm² per NFPA 253 or ASTM E648
- DOC FF-1: Minimum 0.04 watts/cm²

Required classifications: (Sec. 804.4)

	Nonsprinklered ^a		Sprinklered (NFPA 13 only)	
	Exit/Corr. ^b	Other Areas	Exit/Corr. ^b	Other Areas
Groups I-1, I-2 and I-3	Class I	DOC FF-1 ^c	Class II	DOC FF-1 ^c
Groups F, R-3, R-4 and U	DOC FF-1 ^c	DOC FF-1 ^c	DOC FF-1 ^c	DOC FF-1 ^c
Other Groups	Class II	DOC FF-1 ^c	DOC FF-1 ^c	DOC FF-1 ^c

Note: ^aSection 903.2 requires sprinklers in various occupancies

^bIncludes enclosures for stairways and ramps, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions.

^cCompliance with ASTM D2859 also permitted

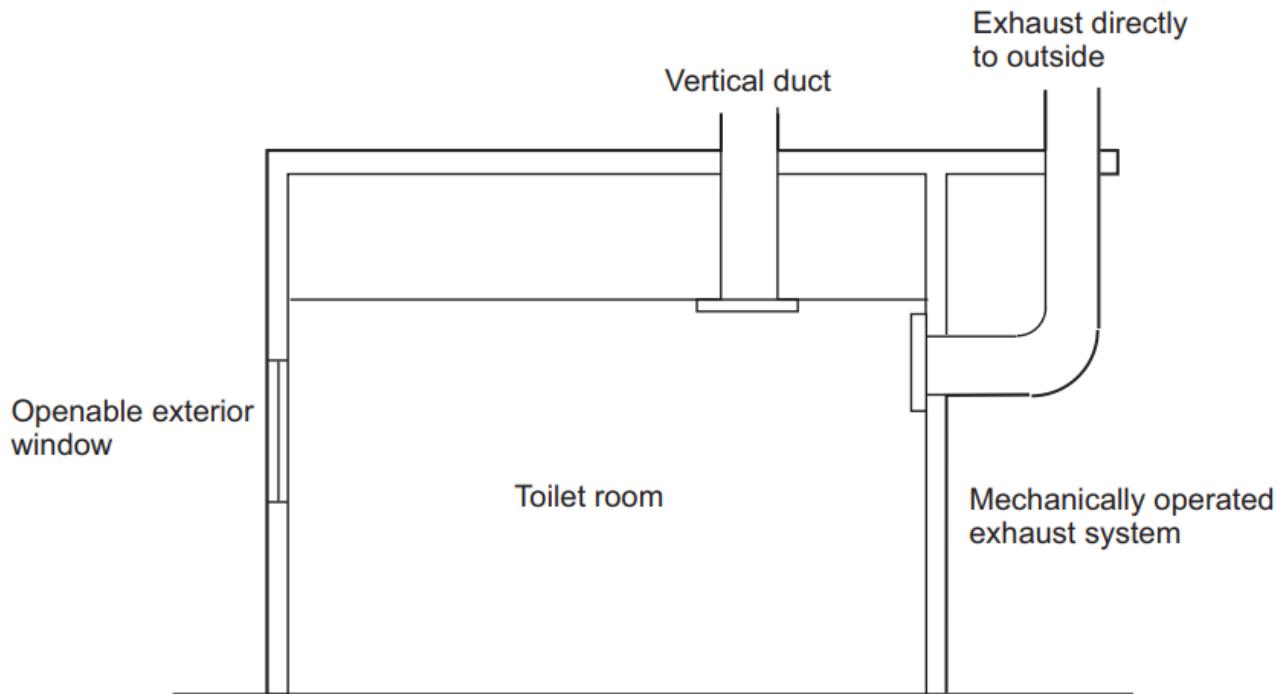
DOC FF-1, often referred to as the Methenamine Pill Test, essentially evaluates the floor covering when subjected to a cigarette-type ignition by using a small methenamine tablet. All carpeting sold in the United States is required by federal law to pass this test procedure.

Topic: General Requirements
Reference: IBC 1202.1, 1202.5

Category: Interior Environment
Subject: Ventilation

Code Text: *Buildings shall be provided with natural ventilation in accordance with Section 1202.5 or mechanical ventilation in accordance with the International Mechanical Code. Natural ventilation of an occupied space shall be through windows, doors, louvers or other openings to the outdoors. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.*

Discussion and Commentary: To obtain a minimum level of environmental comfort, as well as to maintain sanitary conditions, some form of ventilation must be provided to portions of a building that are normally occupied. The *International Mechanical Code* will usually be used to determine the minimum acceptable ventilation methods and quantities.



Ventilation regulated by *International Mechanical Code*

The *International Mechanical Code* regulates ventilation of bathrooms, toilet rooms, shower rooms and similar spaces containing bathtubs, showers and spas. The *International Fire Code*, in addition to the IMC, addresses ventilation and exhaust systems where flammable and combustible hazards are present.

Topic: Attic and Under-Floor Ventilation
Reference: IBC 1202.2, 1202.4

Category: Interior Environment
Subject: Ventilation

Code Text: *Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. The space between the bottom of the floor joists and the earth under any building except spaces occupied by a basement or cellar shall be provided with ventilation in accordance with one of three methods. The openings shall be placed so as to provide cross-ventilation of the under-floor space.*

Discussion and Commentary: Ventilation of the attic and under-floor spaces prevents moisture condensation, which can have adverse effects on the materials of construction located in those spaces. Various exceptions are available that provide equivalent results.

1202.4.1 Ventilation openings. Ventilation openings through foundation walls shall be provided. The openings shall be placed so as to provide cross ventilation of the under-floor space. The net area of ventilation openings shall be in accordance with Section 1202.4.1.1 or 1202.4.1.2. Ventilation openings shall be covered for their height and width with any of the following materials, provided that the least dimension of the covering shall be not greater than $\frac{1}{4}$ inch (6.4 mm):

1. Perforated sheet metal plates not less than 0.070 inch (1.8 mm) thick.
2. Expanded sheet metal plates not less than 0.047 inch (1.2 mm) thick.
3. Cast-iron grilles or gratings.
4. Extruded load-bearing vents.
5. Hardware cloth of 0.035-inch (0.89 mm) wire or heavier.
6. Corrosion-resistant wire mesh, with the least dimension not greater than $\frac{1}{8}$ inch (3.2 mm).
7. Operable louvres, where ventilation is provided in accordance with Section 1202.4.1.2.



An example of a ventilation well outside of a building

Topic: Attic and Under-Floor Ventilation

Reference: IBC 1202.2, 1202.4

Category: Interior Environment

Subject: Ventilation

- ❖ Crawl spaces that are intended to be naturally ventilated to the outdoors must comply with this section and Section 1202.4.1.1, where the crawl space has open earth floors, or with this section and Section 1202.4.1.2, where the crawl space has covered floors.

The requirement for covering the openings with perforated plates, corrosion-resistant wire mesh or other covering is to keep small animals out. Seven alternatives are given for this covering, and they all must have openings that have no dimension exceeding $\frac{1}{4}$ inch (6.4 mm).



An example of a ventilation well as viewed from inside a commercial crawlspace

1202.4.2 Ventilation in cold climates. In extremely cold climates, where a ventilation opening will cause a detrimental loss of energy, ventilation openings to the interior of the structure shall be provided.

❖ Where warranted by extremely cold climates, this section provides for ventilating the crawl space to the interior conditioned space of the building, which is heated and can accept moisture from the underground space without detrimental effects on the building structure.

If this method of ventilation is proposed, make sure your mechanical engineer is aware of the potential of additional temperature and humidity loads that will be imposed on the building's HVAC system. Consider providing additional conditioning capacity to handle the underfloor space.



Ducts and grilles similar to this one can be used to connect the interior air to the underfloor space air.

Topic: Attic and Under-Floor Ventilation

Reference: IBC 1202.2, 1202.4

Category: Interior Environment

Subject: Ventilation

1202.4.3 Mechanical ventilation. Mechanical ventilation shall be provided to crawl spaces where the ground surface is covered with a Class I vapor retarder. Ventilation shall be in accordance with Section 1202.4.3.1 or 1202.4.3.2.

1202.4.3.1 Continuous mechanical ventilation. Continuously operated mechanical ventilation shall be provided at a rate of 1.0 cubic foot per minute (cfm) for each 50 square feet (1.02 L/s for each 10 m²) of crawl space ground surface area and the ground surface shall be covered with a Class I vapor retarder.

1202.4.3.2 Conditioned space. The crawl space shall be conditioned in accordance with the *International Mechanical Code* and the walls of the crawl space shall be insulated in accordance with the *International Energy Conservation Code*.

Make sure you understand the difference between mechanical ventilation and mechanical conditioning!
Note: a vapor retarder is required when these ventilation options are proposed!



A vapor retarder keeps the moisture from being drawn into the space, helping to keep the underfloor space dry.

Topic: Attic and Under-Floor Ventilation
Reference: IBC 1202.2, 1202.4

Category: Interior Environment
Subject: Ventilation



Condensation on
the underside of
the concrete floor

Topic: Attic and Under-Floor Ventilation
Reference: IBC 1202.2, 1202.4

Category: Interior Environment
Subject: Ventilation



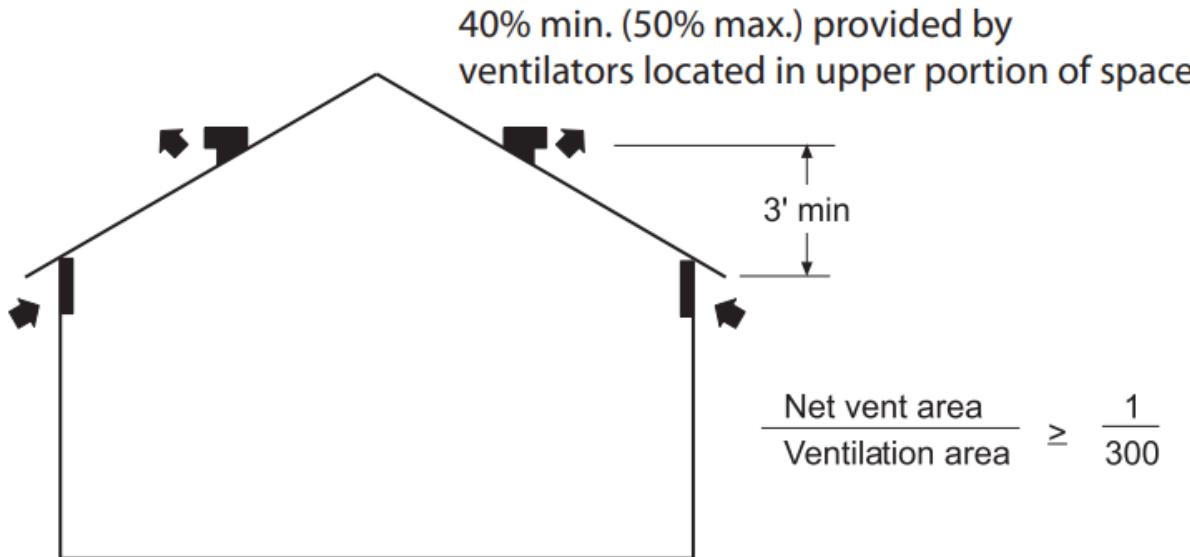
A wet underfloor space can result in damage to the floor finish above.

Topic: Attic and Under-Floor Ventilation
Reference: IBC 1202.2, 1202.4

Category: Interior Environment
Subject: Ventilation



Biological growth
and rot on the
cardboard void
forms



Attic ventilation - calculations

For SI: 1 foot = 304.8 mm.

The general requirement for under-floor ventilation mandates a minimum net area of ventilation openings of $\frac{1}{150}$ of the area of the space ventilated. In addition, all openings to the exterior must be screened to prevent the entry of birds, rodents and similar creatures.

Topic: General Requirements

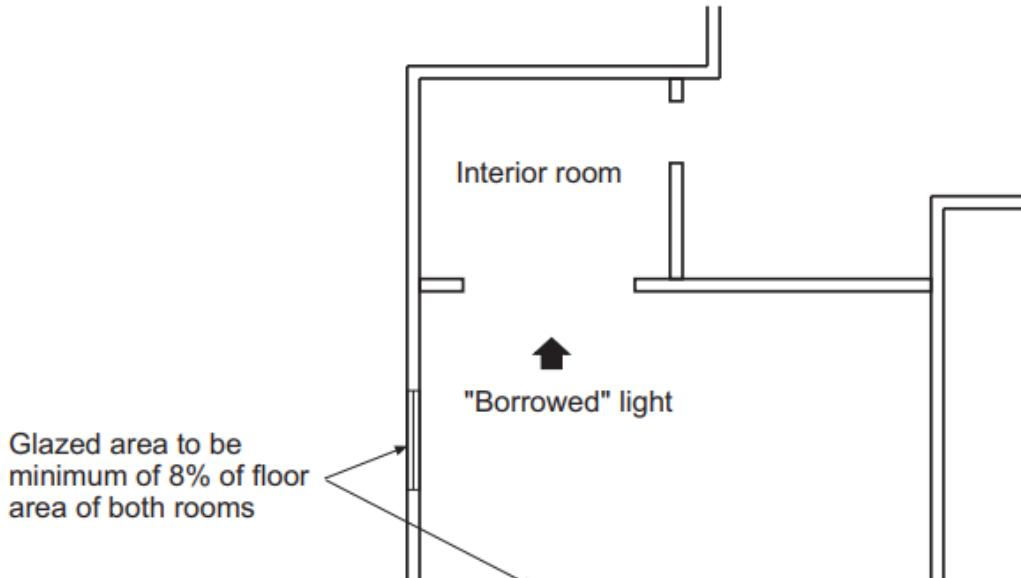
Reference: IBC 1204

Category: Interior Environment

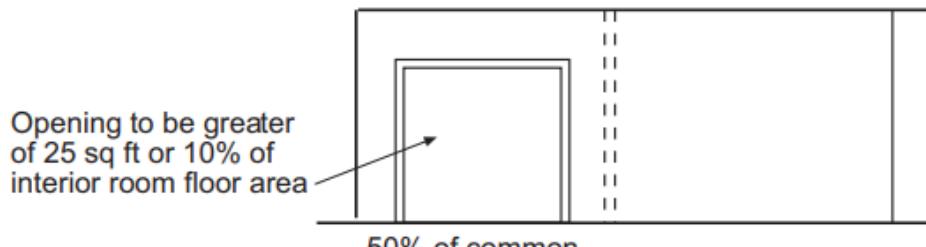
Subject: Lighting

Code Text: *Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings in accordance with Section 1204.2 or shall be provided with artificial light in accordance with Section 1204.3. Exterior glazed openings shall open directly onto a public way or onto a yard or court in accordance with Section 1205. The minimum net glazed area shall not be less than 8 percent of the floor area of the room served. Artificial light shall be provided that is adequate to provide an average illumination of 10 foot-candles (107 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.*

Discussion and Commentary: It is fundamental that all occupiable areas of a building be provided with adequate illumination. The use of artificial light to satisfy the code is acceptable because it can produce the light necessary for occupancy at any time of the day or night.



Plan view



Elevation

For SI: 1 square foot = 0.093 m².

Where natural light is used to satisfy the provisions of the IBC, it can be shared by two rooms. The common wall between the rooms must be adequately open, and the total floor area of both rooms shall be used to calculate the minimum glazed area.

Source: 2021 IBC

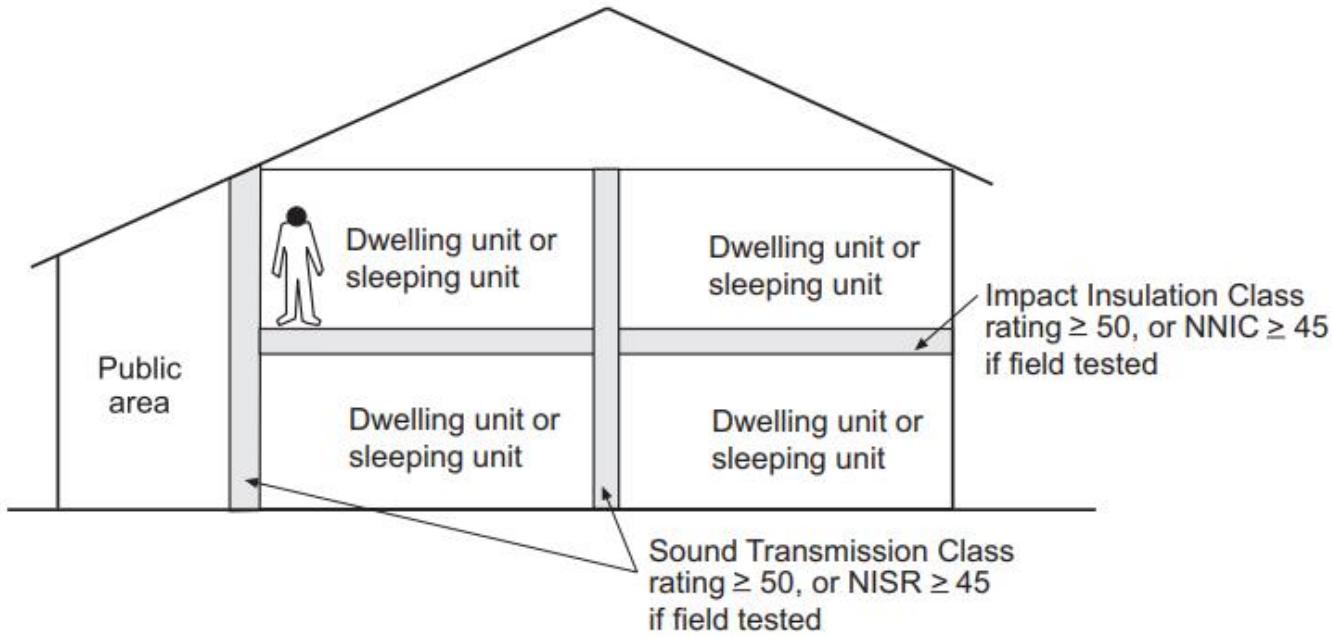
Topic: General Requirements
Reference: IBC 1206.2, 1206.3

Category: Interior Environment
Subject: Sound Transmission

Code Text: *Walls, partitions and floor/ceiling assemblies separating dwelling units and sleeping units from each other or from public or service areas shall have a sound transmission class of not less than 50 where tested in accordance with ASTM E90, or have a Normalized Noise Isolation Class (NNIC) rating of not less than 45 if field tested, in accordance with ASTM E336 for airborne noise. Floor/ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area within the structure shall have an impact insulation class rating of not less than 50 where tested in accordance with ASTM E492, or have a Normalized Impact Sound Rating (NISR) of not less than 45 if field tested in accordance with ASTM E1007.*

Discussion and Commentary: To control sound transmission between areas of a residential building, insulated walls and floor/ceiling assemblies are necessary. The regulations address air-borne sound that may be carried throughout the structure, as well as impact noise created on the floor of a floor/ceiling assembly.

[Impact sound reduction -Testing with a tapping machine-- YouTube](#)



To maintain the required ratings, it is necessary to seal, line, insulate or otherwise treat penetrations through the sound transmission assemblies. The code exempts unit entrance doors from sound transmission limits, provided that they are tight fitting to the frame and sill.

Scope of Code-Required Acoustic Control

Chapter 12: Interior Environment
Section 1206: Sound Transmission
Scope:

SECTION 1206 SOUND TRANSMISSION

1206.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent *dwelling units* and *sleeping units* or between *dwelling units* and *sleeping units* and adjacent public areas such as halls, *corridors, stairways or service areas*.

Limited to Dwelling Unit and Sleeping Unit separations [vertical construction (walls) and horizontal construction (floors)].

Scope of Code-Required Acoustic Control

[A] DWELLING UNIT. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

[A] SLEEPING UNIT. A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

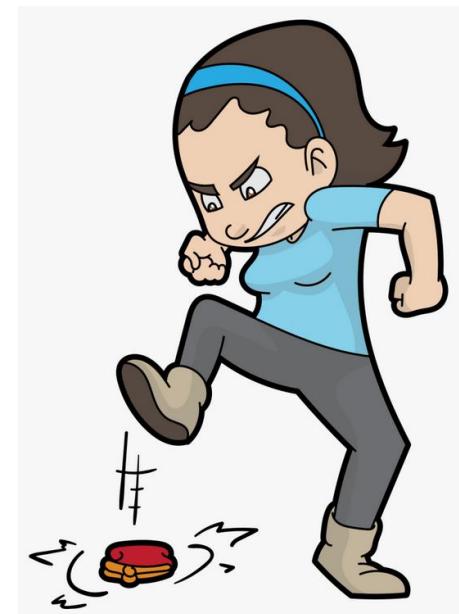
Two Types of Sound Control Required

STC – Sound Transmission Class

-Measures Airborne Sound (Such as:
music, talking, laughing, TV, etc.)

IIC – Impact Insulation Class

-Measures Structure-borne Sound
(Such as: stomping your feet,
dropping something on the floor,
moving furniture, etc.)



Airborne Sound – IBC

1206.2 Airborne sound. Walls, partitions and floor-ceiling assemblies separating *dwelling units* and *sleeping units* from each other or from public or service areas shall have a sound transmission class of not less than 50, or not less than 45 if field tested, for airborne noise where tested in accordance with ASTM E90. Alternatively, the sound transmission class of walls, partitions and floor-ceiling assemblies shall be established by engineering analysis based on a comparison of walls, partitions and floor-ceiling assemblies having sound transmission class ratings as determined by the test procedures set forth in ASTM E90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

Airborne Sound - IBC

ASTM E90-09(2016) ①

Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

Example of a tested assembly (from Gypsum Association Fire Resistance Design Manual):

GA FILE NO. WP 3910	GENERIC	2 HOUR FIRE	50 to 54 STC SOUND
GYPSUM WALLBOARD, WOOD STUDS			
<p>Base layer $\frac{5}{8}$" type X gypsum wallboard or gypsum veneer base applied at right angles to each side of 2 x 4 wood studs 16" o.c., staggered 8" o.c. on 2 x 6 wood plates, with 6d coated nails, 17/8" long, 0.085" shank, 1/4" heads, 24" o.c. Face layer $\frac{5}{8}$" type X gypsum wallboard or gypsum veneer base applied at right angles to each side with 8d coated nails, 23/8" long, 0.113" shank, 9/32" heads, 8" o.c.</p> <p>Joints staggered 16" each layer and side. Sound tested with nails for base layer spaced 6" o.c. Horizontal bracing required at mid-height. (LOAD-BEARING)</p>			
Thickness:		8"	
Approx. Weight:		13 psf See WP 4135	
Fire Test:		(FM WP 360, 9-27-74); UL R4024, 10-31-68	
Sound Test:		NGC 2377, 5-19-70	

Minimum Standard vs. Acceptable or Preferred

From ICC G2-2010 - Guideline for Acoustics

Table 2: Grades of Laboratory Acoustical Performance

Laboratory Sound Rating	Acceptable Performance (Grade B Performance)	Preferred Performance (Grade A Performance)
Airborne Sound (STC per ASTM E 90)	55	60
Impact Sound (IIC per ASTM E 492)	55	60

Minimum: 50; Acceptable: 55; Preferred: 60

[Presentation - Testing Standards : Airborne Sound Transmission - YouTube](#)

Structure-Borne Sound – IBC

1206.3 Structure-borne sound. Floor-ceiling assemblies between *dwelling units* and *sleeping units* or between a *dwelling unit* or *sleeping unit* and a public or service area within the structure shall have an impact insulation class rating of not less than 50, or not less than 45 if field tested, where tested in accordance with ASTM E492. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

ASTM E492-09(2016)e1ⁱ

Standard Test Method for Laboratory Measurement of
Impact Sound Transmission Through Floor-Ceiling
Assemblies Using the Tapping Machine

Structure-Borne Sound – IBC

From the Gypsum Association Fire Resistance Design Manual:

IMPACT NOISE TEST

To determine the Impact Insulation Classification (IIC) of a floor, a standard ISO impact machine with steel hammers taps on a test floor system installed above a special receiving room. Microphones in the receiving room record the average sound pressure level produced by the tapping machine at $\frac{1}{3}$ octave frequency bands between 100 and 3150 Hz. These measured levels are then normalized to a standard room absorption. The method used is described in *ASTM E 492, Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.*

1 HOUR FIRE	45 to 49 STC SOUND

Approx. Ceiling Weight: 5 psf
Fire Test: NRCC A-4440.1 (Revised), 6-24-97
Sound Test: NRCC B-3150.1, 6-30-00
IIC & Test: 40 (68 C & P)
NRCC B-3150.1, 6-30-00;
NRCC B-3150.2, 6-30-00

Minimum Standard vs. Acceptable or Preferred

From ICC G2-2010 - Guideline for Acoustics

Table 2: Grades of Laboratory Acoustical Performance

Laboratory Sound Rating	Acceptable Performance (Grade B Performance)	Preferred Performance (Grade A Performance)
Airborne Sound (STC per ASTM E 90)	55	60
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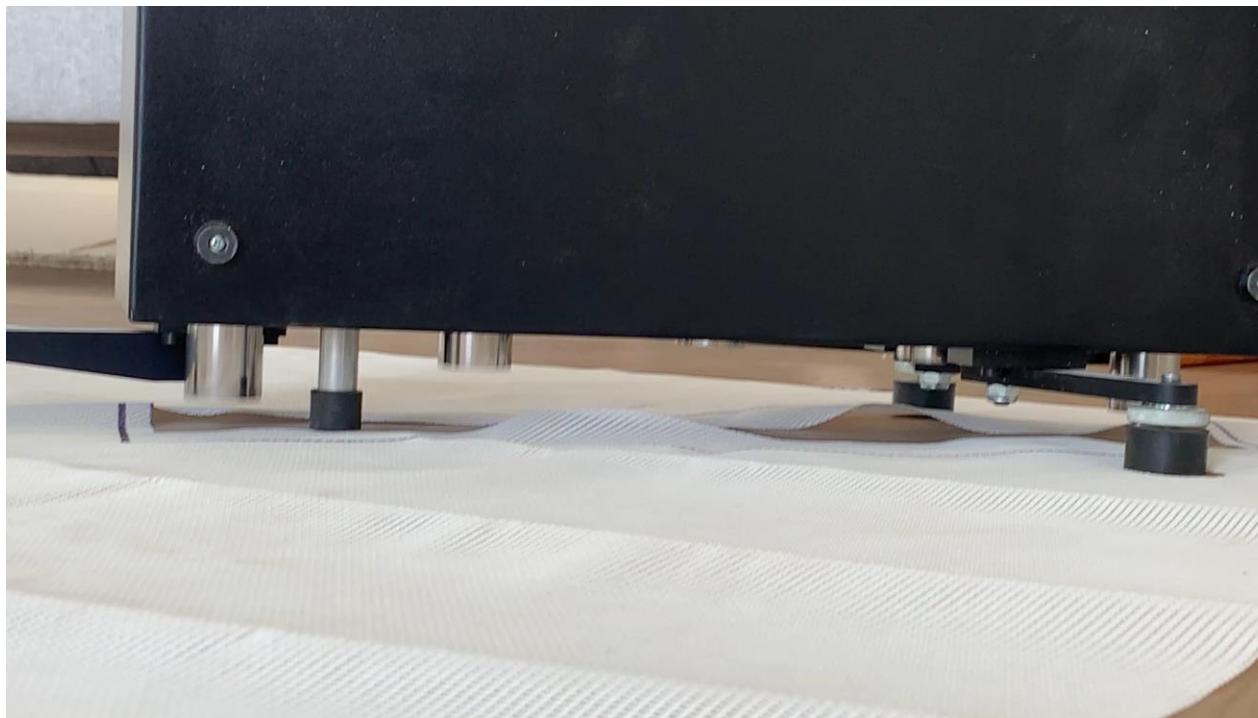
Minimum: 50; Acceptable: 55; Preferred: 60

Example of a Tapping Machine



Tapping machine is set up on the floor above, microphones below to capture the sound transmission.

Example of a Tapping Machine

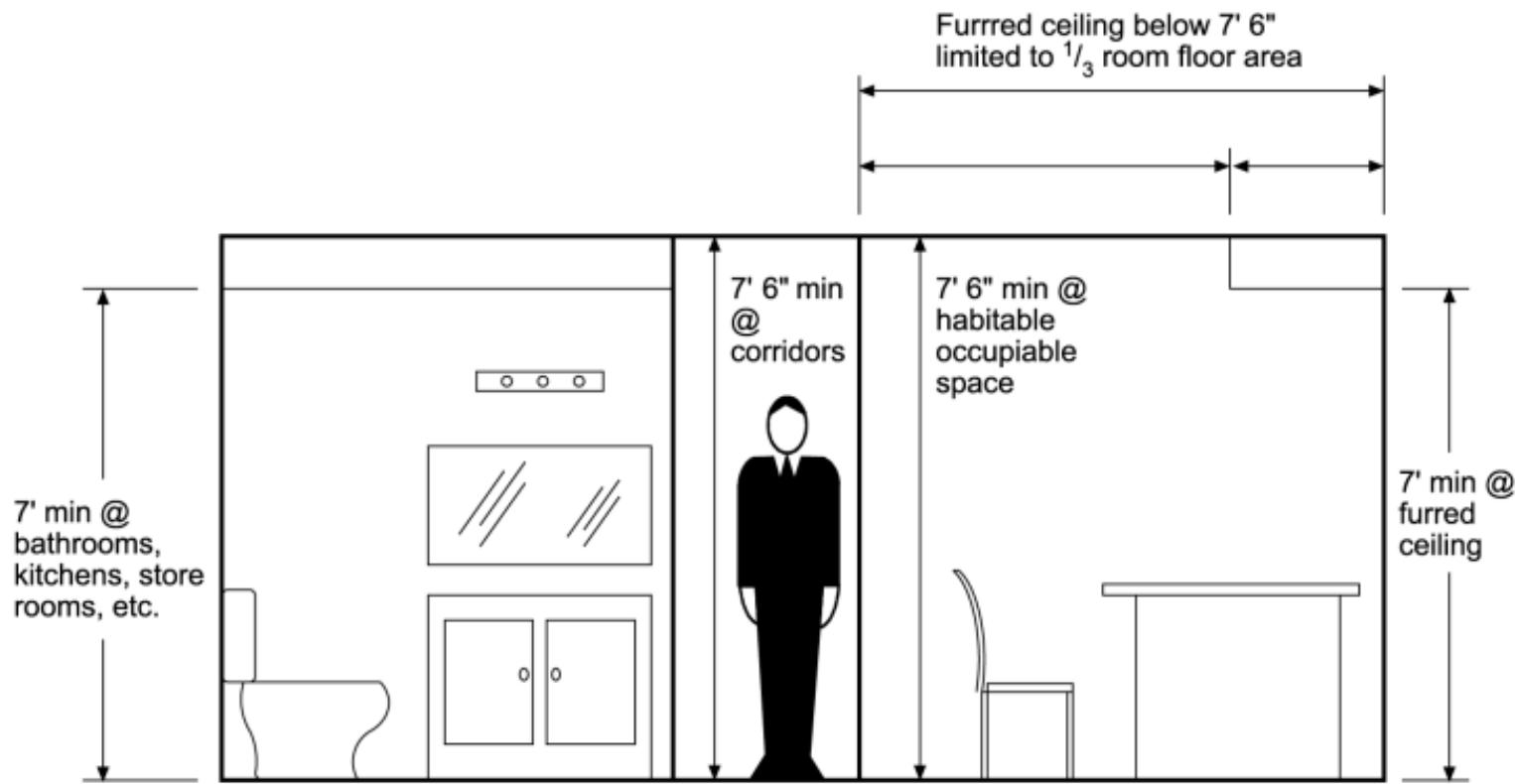


Topic: Room Size and Ceiling Height
Reference: IBC 1208

Category: Interior Environment
Subject: Interior Space Dimensions

Code Text: *Habitable spaces, other than a kitchen, shall not be less than 7 feet (2134 mm) in any plan dimension. Kitchens shall have a clear passageway of not less than 3 feet (914 mm) between counter fronts and appliances or counter fronts and walls. Occupiable spaces, habitable spaces and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm) above the finished floor. Bathrooms, toilet rooms, kitchens, storage rooms and laundry rooms shall have a ceiling height of not less than 7 feet (2134 mm) above the finished floor. See the exceptions for ceilings with exposed beams, sloped ceilings, mezzanines and corridors. Every dwelling unit shall have not less than one room that shall have not less than 120 square feet (13.9 m^2) of net floor area. Other habitable rooms shall have a net floor area of not less than 70 square feet (6.5 m^2). See the exception for kitchens.*

Discussion and Commentary: For fundamental usability and environmental purposes, it is necessary to mandate minimum requirements for the size and height of occupiable spaces.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

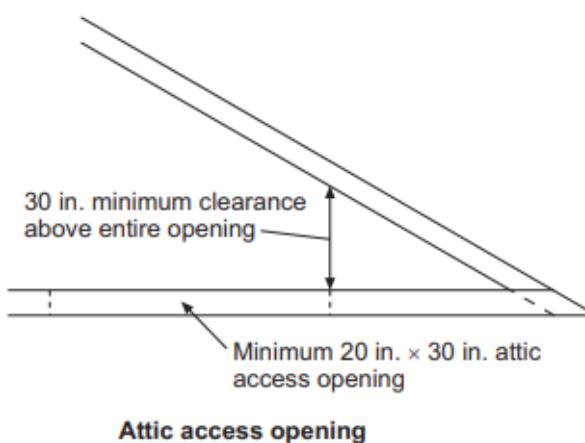
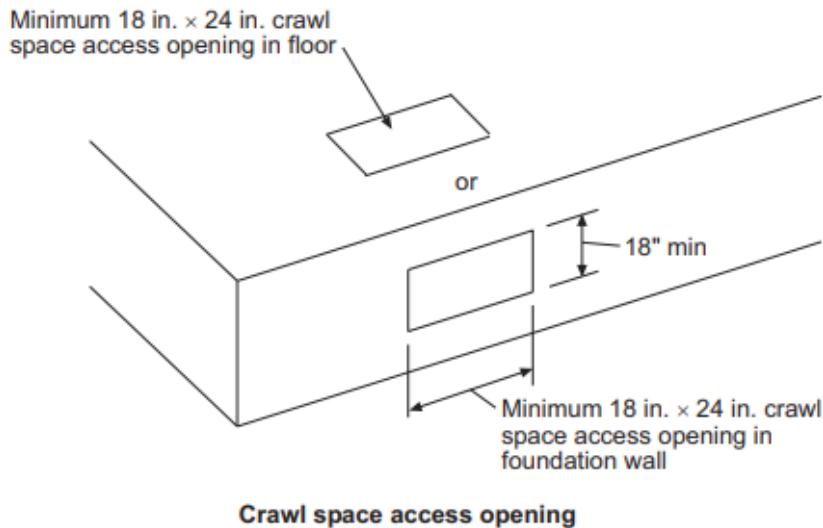
Efficiency dwelling units, often referred to as studio apartments, typically consist of a single room used as a combination living/sleeping/dining/cooking area, and a bathroom. The code regulates living room size at a minimum of 190 square feet, and also addresses the closet, bathroom and kitchen spaces.

Topic: Attics and Crawl Spaces
Reference: IBC 1209.1, 1209.2

Category: Interior Environment
Subject: Access to Unoccupied Spaces

Code Text: *Crawl spaces shall be provided with no fewer than one access opening that shall be not less than 18 inches by 24 inches (457 mm by 610 mm). An opening not less than 20 inches by 30 inches (559 mm by 762 mm) shall be provided to any attic area having a clear height of over 30 inches (762 mm). A 30-inch (762 mm) minimum clear headroom in the attic space shall be provided at or above the access opening.*

Discussion and Commentary: Items such as plumbing and wiring installations pass through crawl space at times. Required initial and periodic inspections and maintenance and repairs cannot be carried out without access to such crawl spaces. Attic access is also required for similar reasons. Although uncommon, access to the attic for fire department purposes can also be accomplished through such openings. The required openings are a convenient and nondestructive means for any user to access such concealed spaces.



For SI: 1 inch = 25.4 mm.

The *International Mechanical Code* regulates access to both underfloor and attic spaces for the inspection, service, repair or replacement of any mechanical equipment. In addition to the access opening, the passageway and service area sizes are also addressed.

Topic: Wall and Floor Finishes
Reference: IBC 1210

Category: Interior Environment
Subject: Surrounding Materials

Code Text: *In other than dwelling units, toilet, bathing and shower room floor finish materials shall have a smooth, hard, nonabsorbent surface. The intersections of such floors with walls shall have a smooth, hard, nonabsorbent vertical base that extends upward onto the walls not less than 4 inches (102 mm). Walls and partitions within 2 feet (610 mm) of urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. See the exceptions for dwelling units, sleeping units and private toilet rooms. Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.*

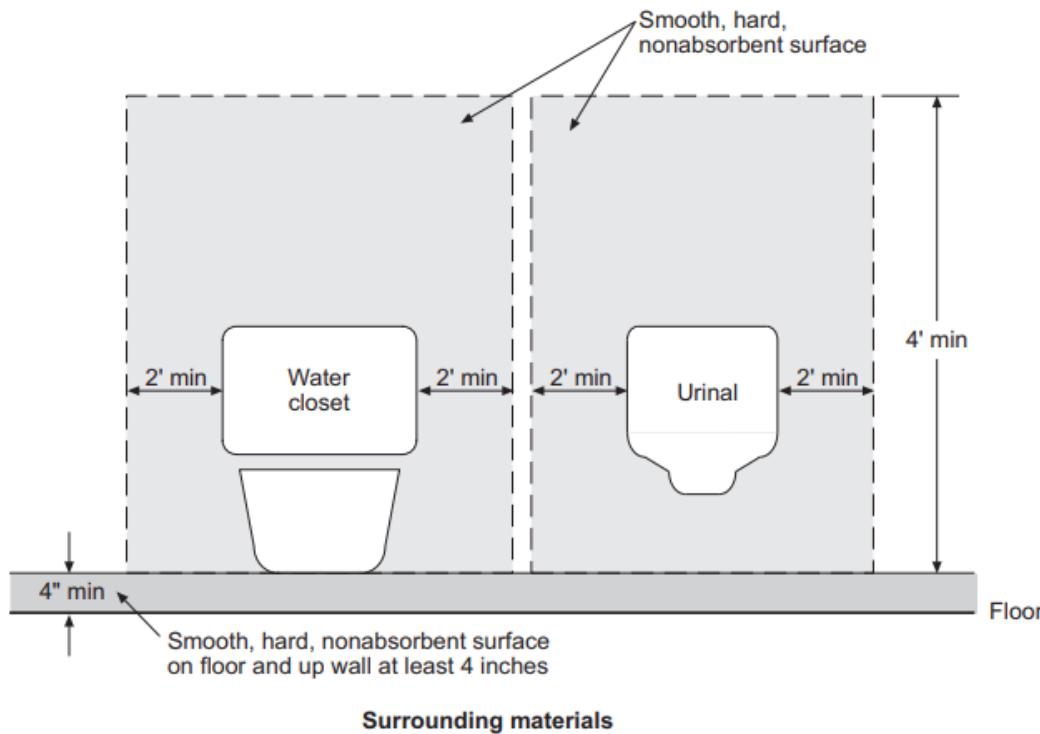
Discussion and Commentary: For sanitary reasons, it is necessary to provide surfaces in bath and toilet areas that are easily cleaned and maintained.

Topic: Wall and Floor Finishes

Reference: IBC 1210

Category: Interior Environment

Subject: Surrounding Materials



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Shower stalls and compartments must be enclosed with smooth, hard, nonabsorbent surfaces to a minimum height of 72 inches above the drain inlet. This requirement is also applicable to those bathtubs that are provided with shower heads.

Source: 2021 IBC

Topic: Installation

Reference: IBC 2508.2, 2508.3

Category: Gypsum Board and Plaster

Subject: Gypsum Construction

Code Text: *Gypsum wallboard or gypsum plaster shall not be used in any exterior surface where such gypsum construction will be exposed directly to the weather. Gypsum wallboard, gypsum lath or gypsum plaster shall not be installed until weather protection for the installation is provided. Edges and ends of gypsum board and gypsum panel products shall occur on the framing members, except those edges and ends that are perpendicular to the framing members.*

Discussion and Commentary: Gypsum wallboard and gypsum panel products, like gypsum plaster, are subject to deterioration from moisture. Accordingly, the code does not permit such gypsum materials to be installed on weather-exposed surfaces, as defined in Section 202. Gypsum materials shall not be installed on interior surfaces until adequate protection from the weather has been provided.

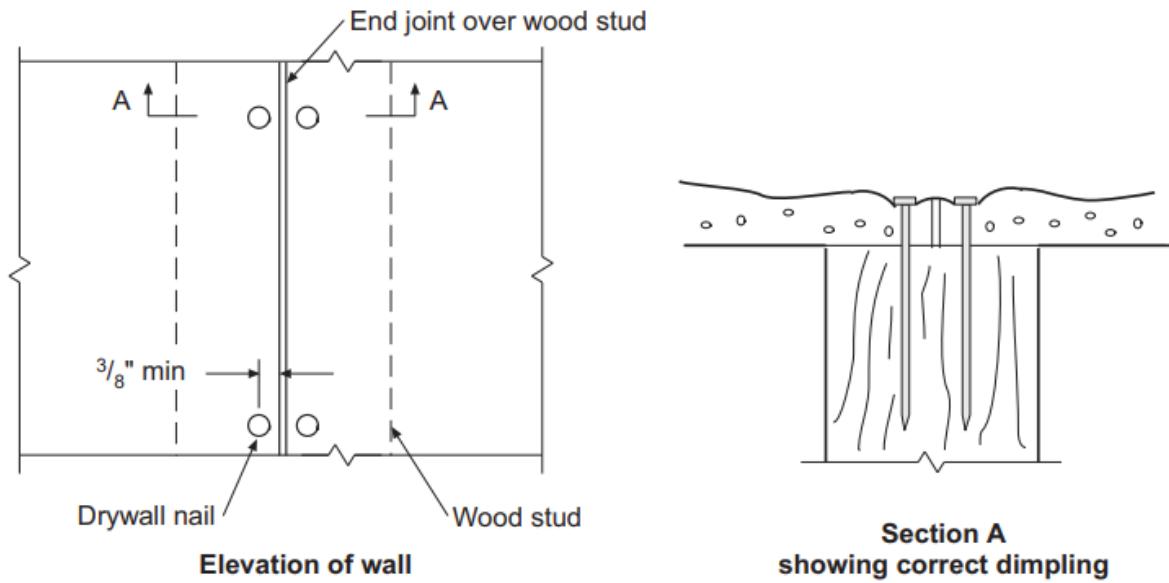
[Gypsum board installation - YouTube](#)

Topic: Installation

Reference: IBC 2508.2, 2508.3

Category: Gypsum Board and Plaster

Subject: Gypsum Construction



Gypsum wallboard nailing

For SI: 1 inch = 25.4 mm.

For appearance purposes in exposed locations, edges and ends of gypsum wallboard and gypsum panel products must be in moderate contact. In concealed areas, such contact is not necessary unless fire-resistance-rated construction, shear resistance or diaphragm action is required.

Topic: Base for Tile

Category: Gypsum Board and Plaster

Reference: IBC 2509.2

Subject: Gypsum Board in Showers

Code Text: *Materials used as a base for wall tile in tub and shower areas and wall and ceiling panels in shower areas shall be of materials listed in Table 2509.2 and installed in accordance with manufacturer recommendations. Water-resistant gypsum backing board shall be used as a base for tile in water closet compartment walls when installed in accordance with GA-216 or ASTM C840 and manufacturer recommendations. Regular gypsum wall-board is permitted under tile or wall panels in other wall and ceiling areas when installed in accordance with GA-216 or ASTM C840.*

Discussion and Commentary: Because of their moisture-resistant qualities, special types of panels or sheets are required when used as a backing material for tile in high-moisture areas. Although water-resistant gypsum backing board is required as a base for tile on public water closet compartment walls, such gypsum board is prohibited for use in three locations: (1) over a vapor retarder in tub or shower compartments, (2) in areas subject to continuous high humidity or where there will be direct exposure to water, and (3) on ceilings with excessive spacing between framing members.

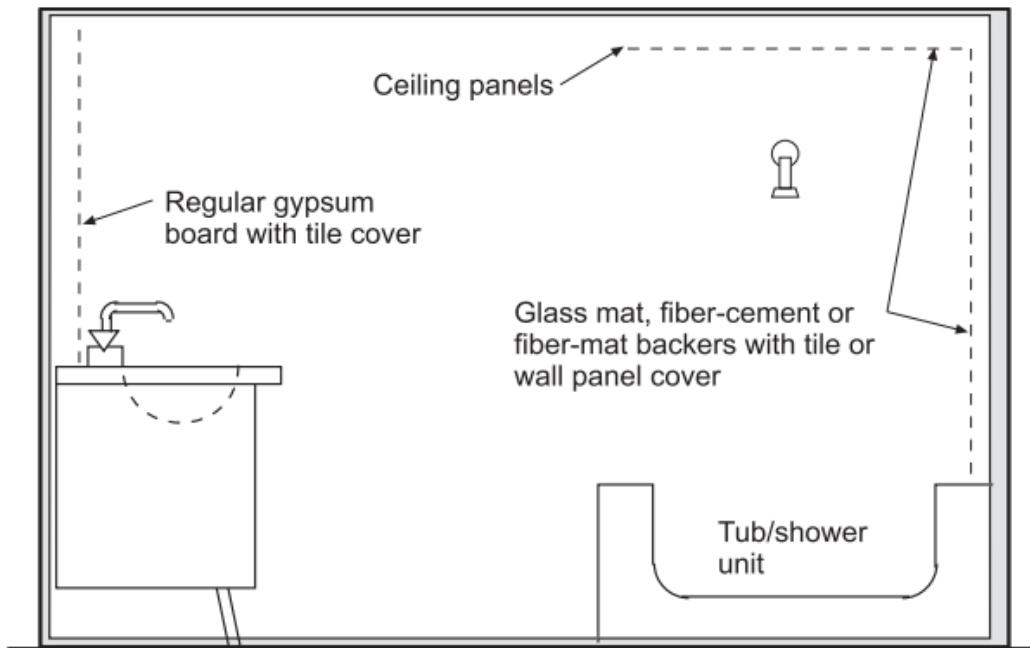
[How To Install Drywall in Your Shower - YouTube](#)

Topic: Base for Tile

Category: Gypsum Board and Plaster

Reference: IBC 2509.2

Subject: Gypsum Board in Showers



For SI: 1 inch = 25.4 mm.

Water-resistant gypsum backing board is prohibited where either one of two general conditions exist:
(1) over a vapor retarder in shower or bathtub compartments, or (2) where there will be direct exposure to water or in areas subject to continuous high humidity.

Source: 2021 IBC

Topic: Weep Screeds

Reference: IBC 2512.1.2

Category: Gypsum Board and Plaster

Subject: Exterior Plaster

Code Text: *A minimum 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage), corrosion-resistant weep screed with a minimum vertical attachment flange of 3 $\frac{1}{2}$ inches (89 mm) shall be provided at or below the foundation plate line on exterior stud walls in accordance with ASTM C926. The weep screed shall be placed a minimum of 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas and be of a type that will allow trapped water to drain to the exterior of the building.*

Discussion and Commentary: Water can penetrate exterior plaster walls for a variety of reasons. Once it penetrates the plaster, the water will run down the exterior face of the weather-resistive barrier until it reaches the sill plate or mudsill. At this point, the water will seek exit from the wall and, if the exterior plaster is not applied to allow the water to escape, it will exit through the inside of the wall and into the interior of the building. Therefore, a weep screed, when properly installed, will permit the water's escape to the exterior of the building.

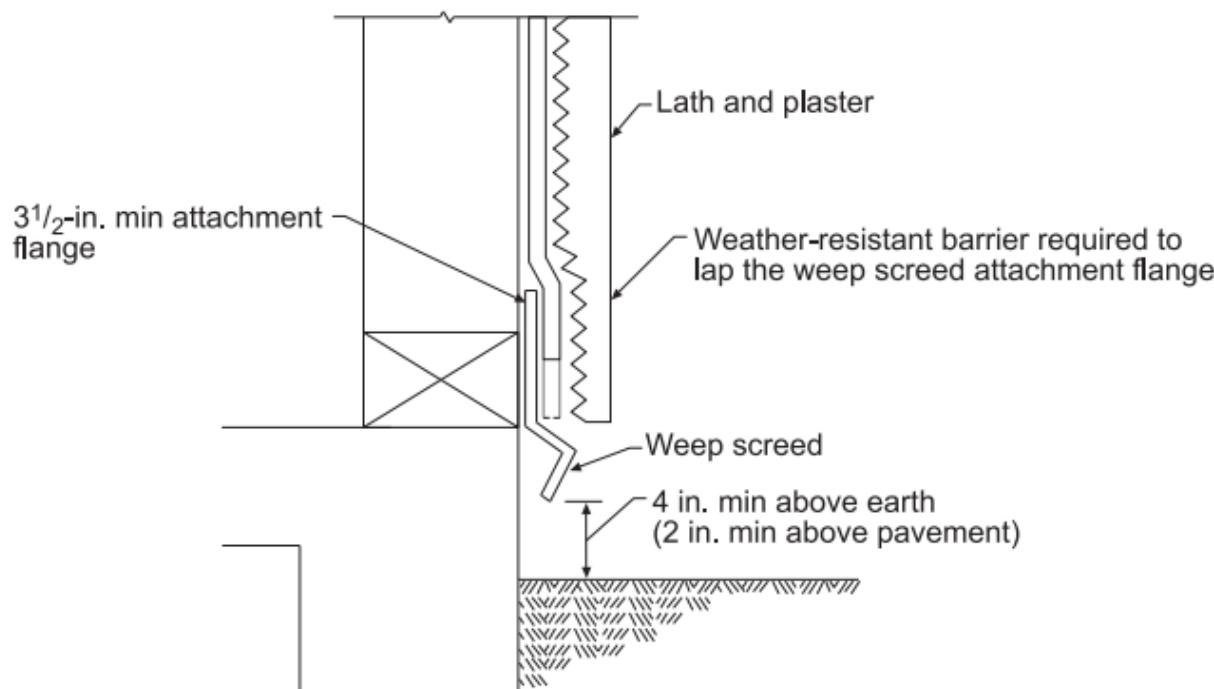
[AMICO Drain Screed](#) • [AMICO Products](#) • [Weep Screeds in Stucco](#)
amicoglobal.com

Topic: Weep Screeds

Reference: IBC 2512.1.2

Category: Gypsum Board and Plaster

Subject: Exterior Plaster



For SI: 1 inch = 25.4 mm.

To allow the water to escape away from the building, the required water-resistive barrier in the wall assembly must lap the attachment flange of the weep screed. In addition, the exterior lath shall cover and terminate on the attachment flange.

Topic: Protection

Reference: IBC 3002.1, 3002.6

Category: Elevators and Conveying Systems

Subject: Hoistways Enclosures

Code Text: *Elevator, dumbwaiter and other hoistway enclosures shall be shaft enclosures complying with Sections 712 and 713. Openings in hoistway enclosures shall be protected as required in Chapter 7. Doors, other than hoistway doors and the elevator car door, shall be prohibited at the point of access to an elevator car unless such doors are readily openable from the car side without a key, tool, special knowledge or effort.*

Discussion and Commentary: An elevator shaft is regulated under the shaft enclosure provisions of Section 713. Generally, an elevator enclosure must be of 2-hour fire-resistance-rated construction in Type I buildings or where four or more stories are connected. A 1-hour rating is permitted where the shaft enclosure connects three stories or less.

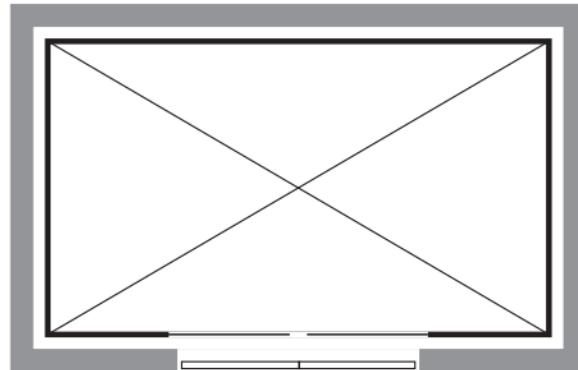
[Dennis W. Olson, C.E.I. | Elevator & Escalator Expert](#)
robsonforensic.com

Topic: Protection

Reference: IBC 3002.1, 3002.6

Category: Elevators and Conveying Systems

Subject: Hoistways Enclosures



Number of stories connected

Four or more

Three or less

Minimum rating of elevator enclosure

2 hours

1 hour

In many buildings, an elevator lobby is provided adjacent to the elevator. To help ensure that an individual does not become trapped within such a lobby, the lobby door must be openable without the use of a key.

Source: 2021 IBC

Topic: Number of Cars in Hoistway

Reference: IBC 3002.2, 3002.7

Category: Elevators and Conveying Systems

Subject: Hoistway Enclosures

Code Text: *Where four or more elevator cars serve all or the same portion of a building, the elevators shall be located in at least two separate hoistways. Not more than four elevator cars shall be located in any single hoistway enclosure. Elevators shall not be in a common shaft enclosure with a stairway. See the exception for open parking garages.*

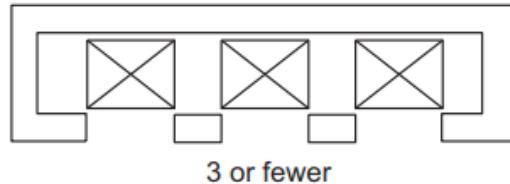
Discussion and Commentary: The basis for limiting the number of elevator cars in a single hoistway is to provide a reasonable level of assurance that a multilevel building served by several elevators would not have all of its elevator cars disabled by a single fire incident. The provisions increase the chance that some of the elevators would remain operational during an emergency situation.

Topic: Number of Cars in Hoistway

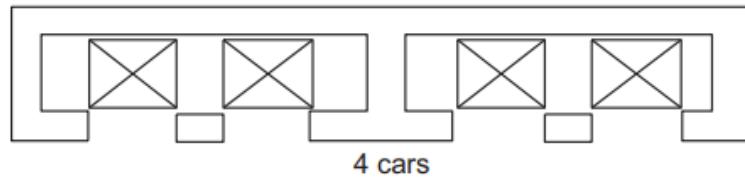
Reference: IBC 3002.2, 3002.7

Category: Elevators and Conveying Systems

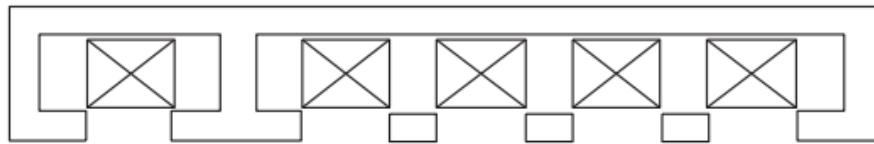
Subject: Hoistway Enclosures



3 or fewer



4 cars



5 or more

Other than for those elevators that are a part of an accessible means of egress or used for occupant self-evacuation in accordance with Section 3008, an approved pictorial sign must be provided adjacent to each elevator call station on all floors.

Topic: Fire Department Emergency Access

Category: Elevators and Conveying Systems

Reference: IBC 3002.4

Subject: Hoistway Enclosures

Code Text: *Where elevators are provided in buildings four or more stories above, or four or more stories below, grade plane, at least one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate an ambulance stretcher 24 inches by 84 inches (610 mm by 2134 mm) with not less than 5-inch (127 mm) radius corners, in the horizontal, open position.*

Discussion and Commentary: In those buildings over three stories in height with one or more elevators, it is necessary that a minimum of one elevator car be of sufficient size to hold an ambulance stretcher. The elevator car must access all floor levels within the building or additional complying cars must be provided to provide such access. The minimum size requirement is based on the stretchers now commonly in use by medical service personnel and emergency responders.

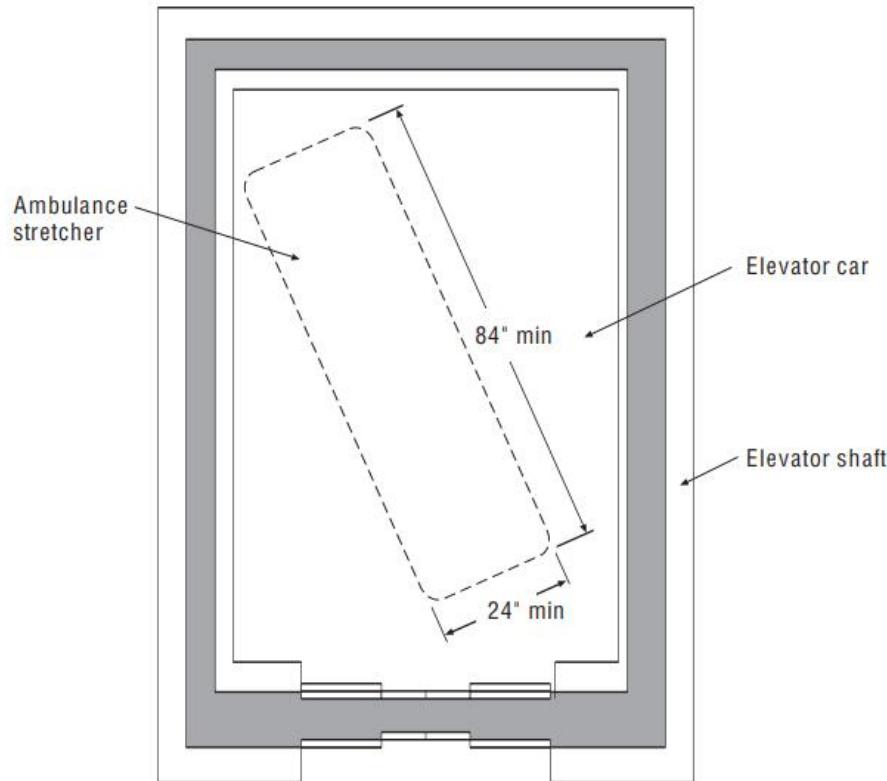
[Basic Elevator Rescue - YouTube](#)

Topic: Fire Department Emergency Access

Reference: IBC 3002.4

Category: Elevators and Conveying Systems

Subject: Hoistway Enclosures



Elevator used for fire department emergency access

For SI: 1 inch = 24.5 mm.

The elevator car sized in a manner to accommodate the required size ambulance stretcher must be identified by the international symbol for emergency medical services (star of life). The symbol is required to be a minimum of 3 inches in height and is to be placed on both sides of the hoistway door frame.

Source: 2021 IBC

Topic: Hoistway Opening Protection

Reference: IBC 3006.2

Category: Elevators and Conveying Systems

Subject: Elevator Lobbies

Code Text: *Elevator hoistway door openings shall be protected in accordance with Section 3006.3 where an elevator hoistway connects more than three stories, is required to be enclosed within a shaft enclosure in accordance with Section 712.1.1 and any of the following conditions apply: See the five conditions including nonsprinklered buildings; Group I-1, Condition 2, I-2 and I-3 occupancies; and high-rise buildings. Also see the three exceptions.*

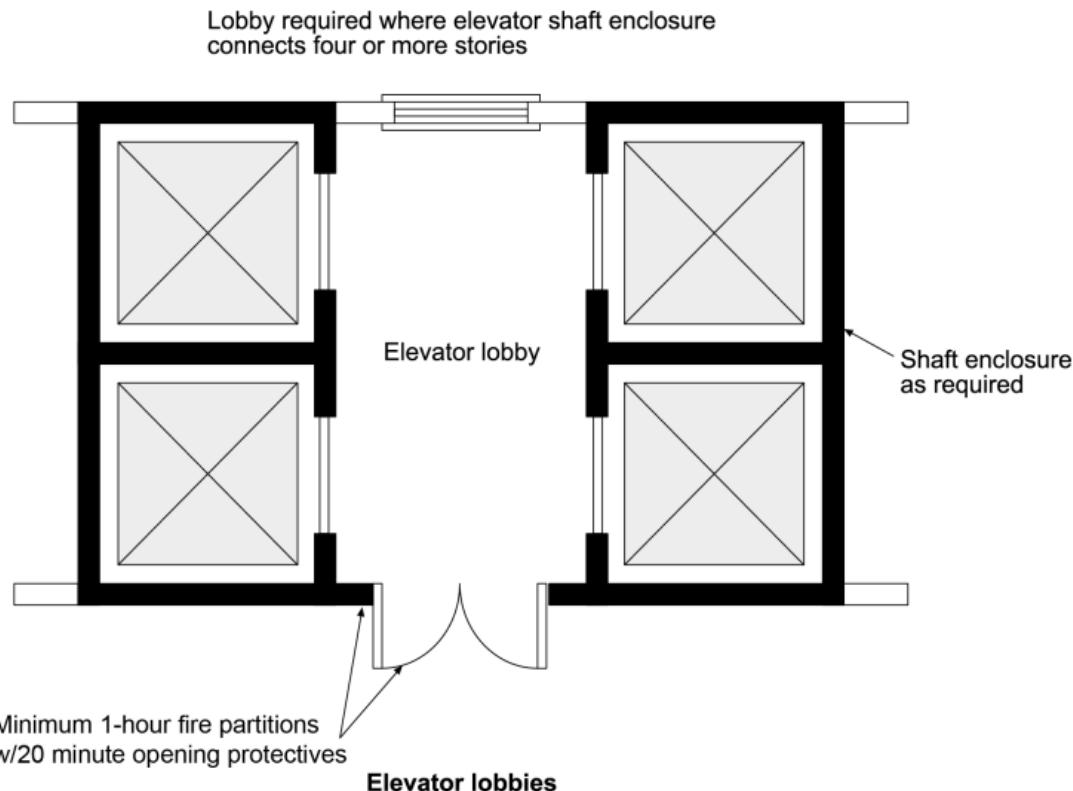
Discussion and Commentary: The purpose of an elevator lobby under this provision is to reduce the potential for smoke to travel from the floor of fire origin to any other floor of the building by way of an elevator shaft enclosure. An allowance is provided for those low-rise buildings where the elevator shaft connects only two or three stories.

Topic: Hoistway Opening Protection

Category: Elevators and Conveying Systems

Reference: IBC 3006.2

Subject: Elevator Lobbies



In those cases where a fire-resistance-rated corridor is required by Section 1020.2 and an elevator hoistway opening opens directly into the corridor, the opening must be protected by either an elevator lobby, an additional door or hoistway pressurization.

Source: 2021 IBC

Topic: General Provisions
Reference: IBC 3007

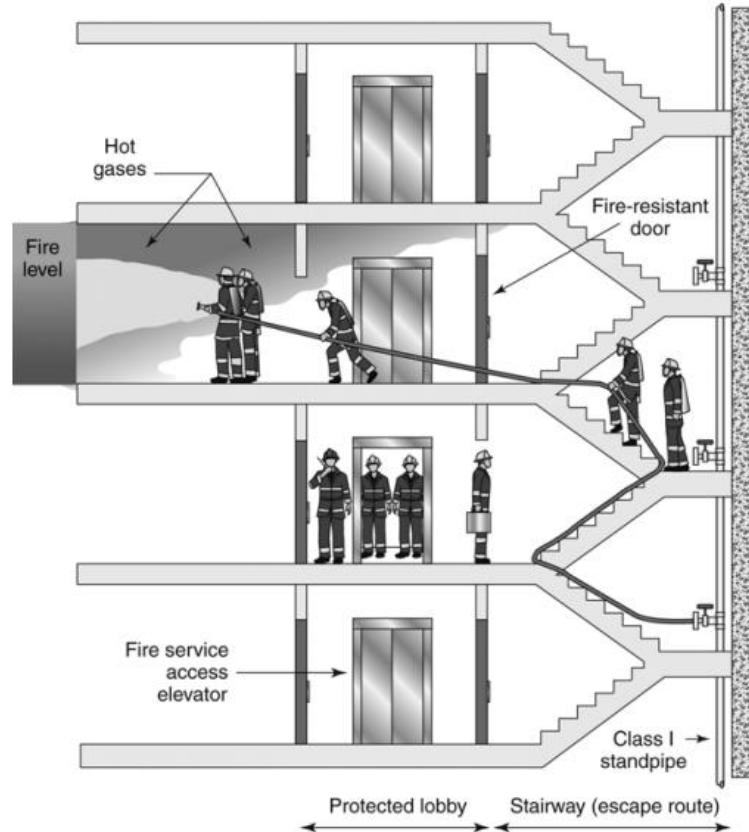
Category: Elevators and Conveying Systems
Subject: Fire Service Access Elevator

Code Text: *Where required by Section 403.6.1 (high-rise buildings with an occupied floor more than 120 feet above the lowest level of fire department vehicle access), every floor above and including the lowest level of fire department vehicle access of the building shall be served by fire service access elevators complying with Sections 3007.1 through 3007.9. The fire service access elevator shall open into a fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.6.5. The enclosed fire service access elevator lobby shall have direct access from the enclosed elevator lobby to an enclosure for an interior exit stairway or ramp. See the exception where equivalent protection is provided.*

Discussion and Commentary: To facilitate the rapid deployment of firefighters, fire service access elevators are required in all high-rise buildings that have at least one floor level more than 120 feet above the lowest level of fire department vehicle access. This type of elevator has a number of key features that will allow firefighters to safely access an area of a building that may be involved in a fire or to facilitate the rescue of building occupants.

Topic: General Provisions
Reference: IBC 3007

Category: Elevators and Conveying Systems
Subject: Fire Service Access Elevator



Another specific type of elevator, an "occupant evacuation" elevator, is also addressed in Chapter 30. Public-use passenger elevators are specifically allowed to be used for the self-evacuation of occupants in high-rise buildings. The installation of such elevators is voluntary; however, they can be installed as an alternative to the additional exit stairway mandated by Section 403.5.2.

Midterm – Extra Credits (CH 1 to 10)

You have an opportunity to earn extra credit points for the IBC course by making videos or writing essays on the topics covered in the course. You can pick any five topics that interest you and create a video or an essay for each one. The videos should be clear and engaging and use real life examples or site visits to demonstrate your understanding of the topic. The videos should be at least 3 minutes long and not more than 5 minutes long. The essays should be 500 words long. You will get one extra credit point for each video or essay you submit.

Title your Youtube Video OR 500 words Report in following format
IBC#- Topic Name

For example:

IBC 510.7 Open Parking Garages

You should cover following content:

Definition, History why the code was developed, Specification a building inspector should consider reviewing the code.

Class Project (20 Points)

Team of 3 to 4 students

Inspection Report writing

Commercial Property Inspection Preliminary Walkthrough - YouTube ← How to conduct property inspection

Flow of a Restaurant Inspection - YouTube

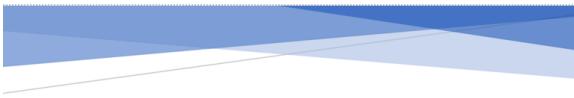
Office Suite Inspection - YouTube ← Examples

Extra Credit!

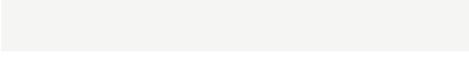
- Create a 10 minute video with your team demonstrating your inspection walk through. Each team member should have a chance to speak in the video. (+5 Points)

Class Project (20 Points)

Format



INSPECTION REPORT

Building Address


Executive Summary

Chapters 1 and 35—Scope and Administration


Chapter 3 and Sections 508 and 509

Chapter 6—Types of Construction


Chapter 5—General Building Heights and Areas

Sections 701 through 705—Fire and Smoke Protection Features I

Sections 706 through 712—Fire and Smoke Protection Features II

 Update

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Chapter 6—Types of Construction	3
Chapter 5—General Building Heights and Areas	3
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Sections 706 through 712—Fire and Smoke Protection Features II	3
Sections 713 through 720—Fire and Smoke Protection Features III	3
Chapter 9—Fire Protection and Life Safety Systems	4
Sections 1001 through 1005, 1008, 1009, 1013 and 1015—Means of Egress I	4
Sections 1010 through 1012 and 1014—Means of Egress II	4
Sections 1006, 1007 and 1016 through 1021—Means of Egress III	4
Sections 1022 through 1031—Means of Egress IV	4
Chapter 11—Accessibility, Chapter 4—Special Detailed Requirements Based on Use and Occupancy	4
Chapters 14, 15 and 18—Exterior Wall Coverings, Roofs and Foundations	4
Chapters 16, 17, 19, 21, 22 and 23—Special Inspections, Concrete, Masonry and Wood, Chapters 24 and 26—Glazing, Skylights and Plastics	5

**Minimum 300 word each chapter
(Photos are encouraged)**

Class Project (20 Points)

Team of 3 to 4 students

Inspection Report writing

Commercial Property Inspection Preliminary Walkthrough - YouTube ← How to conduct property inspection

Flow of a Restaurant Inspection - YouTube

Office Suite Inspection - YouTube ← Examples

Extra Credit!

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