CONST-181
Building Code Interpretation: Non-Structural

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)

In a Group A-2 occupancy, an automatic sprinkler system shall be provided throughout any fire area having a minimum occupant load of _____.

a. 50
b. 60
c. 100
d. 3,000

[F] 903.2.1.2 Group A-2. An *automatic sprinkler system* shall be provided throughout stories containing Group A-2 occupancies and throughout all stories from the Group A-2 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 5,000 square feet (464 m^2).
2. The *fire area* has an *occupant load* of 100 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

Provisions of the appendix do not apply unless _____.

a. specified in the code
b. applicable to unique conditions
c. specifically adopted
d. relevant to fire or life safety

[A] 101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, relocation, enlargement, replacement, *repair*, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

Exception: Detached one- and two-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate *means of egress*, and their accessory structures not more than three *stories above grade plane* in height, shall comply with this code or the *International Residential Code*.

[A] 101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

The building official has the authority to _____ the provisions of the code.

a. ignore
b. waive
c. violate
d. interpret

SECTION 104
DUTIES AND POWERS OF BUILDING OFFICIAL

[A] 104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code. The *building official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

. Which one of the following inspections is not specifically identified by the *International Building Code* as a required inspection, where applicable?

a. footing inspection

b. frame inspection

c. soil classification inspection

d. weather-exposed balcony waterproofing inspection

[A] 110.3.7 Weather-exposed balcony and walking surface waterproofing. Where balconies or other elevated walking surfaces have *weather-exposed surfaces*, and the structural framing is protected by an impervious moisture barrier, all elements of the impervious moisture barrier system shall not be concealed until inspected and *approved*.

Exception: Where *special inspections* are provided in accordance with Section 1705.1.1, Item 3.

[A] 110.3.8 Fire- and smoke-resistant penetrations. Protection of joints and penetrations in fire-resistance-rated assemblies, *smoke barriers* and *smoke partitions* shall not be concealed from view until inspected and *approved*.

[A] 110.3.9 Energy efficiency inspections. Inspections shall be made to determine compliance with Chapter 13 and shall include, but not be limited to, inspections for: envelope insulation *R*- and *U*-values, *fenestration U*-value, duct system *R*-value, and HVAC and water-heating equipment efficiency.

[A] 110.3.10 Other inspections. In addition to the inspections specified in Sections 110.3.1 through 110.3.9, the *building official* is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the department of building safety.

[A] 110.3.11 Special inspections. For *special inspections*, see Chapter 17.

[A] 110.3.12 Final inspection. The final inspection shall be made after all work required by the building *permit* is completed.

[A] 110.3.12.1 Flood hazard documentation. If located in a *flood hazard area*, documentation of the elevation of the *lowest floor* as required in Section 1612.4 shall be submitted to the *building official* prior to the final inspection.

[A] 110.2 Preliminary inspection. Before issuing a *permit*, the *building official* is authorized to examine or cause to be examined buildings, structures and *sites* for which an application has been filed.

[A] 110.3 Required inspections. The *building official*, upon notification, shall make the inspections set forth in Sections 110.3.1 through 110.3.12.

[A] 110.3.1 Footing and foundation inspection. Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready mixed in accordance with ASTM C94, the concrete need not be on the job.

[A] 110.3.2 Concrete slab and under-floor inspection. Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed, including the subfloor.

[A] 110.3.3 Lowest floor elevation. In *flood hazard areas*, upon placement of the *lowest floor*, including the *basement*, and prior to further vertical construction, the elevation certification required in Section 1612.4 or the *International Residential Code*, as applicable, shall be submitted to the *building official*.

[A] 110.3.4 Frame inspection. Framing inspections shall be made after the roof deck or sheathing, all framing, *fireblocking* and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are *approved*.

[A] 110.3.5 Types IV-A, IV-B and IV-C connection protection inspection. In buildings of Types IV-A, IV-B and IV-C construction, where connection *fire-resistance ratings* are provided by wood cover calculated to meet the requirements of Section 2304.10.1, inspection of the wood cover shall be made after the cover is installed, but before any other coverings or finishes are installed.

[A] 110.3.6 Lath, gypsum board and gypsum panel product inspection. Lath, *gypsum board* and *gypsum panel product* inspections shall be made after lathing, *gypsum board* and *gypsum panel products*, interior and exterior, are in place, but before any plastering is applied or *gypsum board* and *gypsum panel product* joints and fasteners are taped and finished.

Exception: *Gypsum board* and *gypsum panel products* that are not part of a fire-resistance-rated assembly or a shear assembly.

Unless extended by the building official, what is the maximum time period allowed to be granted for a permit issued on a temporary structure?

a. 90 days
b. 180 days
c. 1 year
d. 2 years

[A] 108.1 General. The *building official* is authorized to issue a *permit* for temporary structures and temporary uses. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause.

When a building permit is issued, the construction documents shall be approved as _____ .

a. "Approved for Construction"
b. "Conditional Approval"
c. "Accepted as Reviewed"
d. "Reviewed for Code Compliance"

[A] 107.3.1 Approval of construction documents. When the *building official* issues a *permit*, the *construction documents* shall be *approved*, in writing or by stamp, as "Reviewed for Code Compliance." One set of *construction documents* so reviewed shall be retained by the *building official*. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the *building official* or a duly authorized representative.

A permit is not required for the construction of a fence where the fence is a maximum of _____ feet in height.

a. 5
b. 7
c. 6
d. 8

[A] 105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided that the floor area is not greater than 120 square feet (11 m^2).
2. Fences not over 7 feet (2134 mm) high.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.

. The certificate of occupancy shall contain all of the following information except:

a. the name of the building owner or owner's authorized agent

b. the name of the building official

c. the building's type of construction

d. the building's allowable height and area

[A] 111.2 Certificate issued. After the *building official* inspects the building or structure and does not find violations of the provisions of this code or other laws that are enforced by the department, the *building official* shall issue a certificate of occupancy that contains the following:

1. The *permit* number.
2. The address of the structure.
3. The name and address of the *owner* or the owner's authorized agent.
4. A description of that portion of the structure for which the certificate is issued.
5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code.
6. The name of the *building official*.
7. The edition of the code under which the *permit* was issued.
8. The use and occupancy, in accordance with the provisions of Chapter 3.
9. The type of construction as defined in Chapter 6.
10. The design *occupant load*.
11. Where an *automatic sprinkler system* is provided, whether the sprinkler system is required.
12. Any special stipulations and conditions of the building *permit*.

A facility used for supervised custodial care and housing more than 16 persons in a supervised environment is classified as a Group _____ occupancy.

a. I-1

b. I-4

c. R-3

d. R-4

308.2 Institutional Group I-1. Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a *24-hour basis* in a supervised environment and receive *custodial care*. Buildings of Group I-1 shall be classified as one of the occupancy conditions specified in Section 308.2.1 or 308.2.2 and shall comply with Section 420. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Group homes
Halfway houses
Residential board and care facilities
Social rehabilitation facilities

A fraternity house with 40 occupants is considered a Group _____ occupancy.

a. R-1

b. R-2

c. R-3

d. R-4

310.3 Residential Group R-2. Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

- Apartment houses
- *Congregate living facilities* (nontransient) with more than 16 occupants
  - *Boarding houses* (*nontransient*)
  - Convents
  - *Dormitories*
  - Fraternities and sororities
  - Monasteries
- Hotels (nontransient)
- *Live/work units*
- Motels (nontransient)
- Vacation timeshare properties

The gaming floor of a large casino shall be classified as a Group _____ occupancy.

a. A-2
b. A-3
c. B
d. M

303.3 Assembly Group A-2. Group A-2 occupancy includes assembly uses intended for food and/or drink consumption including, but not limited to:

Banquet halls

Casinos (*gaming areas*)

Nightclubs

Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)

Taverns and bars

A food processing establishment not associated with a restaurant or similar dining facility is classified as a Group B occupancy where it is a maximum of _____ square feet in floor area.

a. 1,000
b. 1,500
c. 2,000
d. 2,500

SECTION 304
BUSINESS GROUP B

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers

Ambulatory care facilities

Animal hospitals, kennels and pounds

Banks

Barber and beauty shops

Car wash

Civic administration

Clinic, outpatient

Clinic, outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service

Educational occupancies for students above the 12th grade including *higher education laboratories*

Electronic data processing

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m^2) in area

Laboratories: testing and research

Motor vehicle showrooms

Post offices

Print shops

Professional services (architects, attorneys, dentists, physicians, engineers, etc.)

Radio and television stations

Telephone exchanges

Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy)

Prior to any permitted increases, the maximum allowable quantity per control area of a Class IB flammable liquid permitted in a storage condition in a one-story Group F-1 occupancy is _____gallons.

a. 15
b. 30
c. 60
d. 120

TABLE 307.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fiber[q]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled[o]		(1,000)			(1,000)			(200)	
Flammable liquid[c]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA

Buildings containing materials that present a detonation hazard are typically considered _____ occupancies.

a. Group H-1
b. Group H-2
c. Group H-3
d. Group H-5

[F] 307.3 High-hazard Group H-1. Buildings and structures containing materials that pose a detonation hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials

Explosives:

Division 1.1
Division 1.2
Division 1.3
Division 1.4
Division 1.5
Division 1.6

Organic peroxides, unclassified detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

Where a training and skill development use not classified as a Group A occurs in other than a school or academic program, it is classified as a Group _____ occupancy.

a. I-3

b. B

c. E

d. M

SECTION 304
BUSINESS GROUP B

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers

Ambulatory care facilities

Animal hospitals, kennels and pounds

Banks

Barber and beauty shops

Car wash

Civic administration

Clinic, outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service

Educational occupancies for students above the 12th grade including *higher education laboratories*

Electronic data processing

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m^2) in area

Laboratories: testing and research

Motor vehicle showrooms

Post offices

Print shops

Professional services (architects, attorneys, dentists, physicians, engineers, etc.)

Radio and television stations

Telephone exchanges

Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy)

Fences are to be classified as a Group U occupancy where more than _____ feet in height.

a. 4

b. 5

c. 6

d. 7

SECTION 312
UTILITY AND MISCELLANEOUS GROUP U

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

Agricultural buildings

Aircraft hangars, accessory to a one- or two-family residence (see Section 412.4)

Barns

Carports

Communication equipment structures with a *gross floor area* of less than 1,500 square feet (139 m^2)

Fences more than 7 feet (2134 mm) in height

Grain silos, accessory to a residential occupancy

Livestock shelters

Private garages

Retaining walls

Sheds

Stables

Tanks

Towers

In the determination of allowable building area for a mixed occupancy building, the _____ occupancies method requires the sum of the ratios of the actual building area of each occupancy divided by the allowable building area of each occupancy to be not greater than 1.0.

a. accessory
b. incidental
c. nonseparated
d. separated

508.4.2 Allowable building area. In each *story*, the *building area* shall be such that the sum of the ratios of the actual *building area* of each separated occupancy divided by the allowable *building* area of each separated occupancy shall not exceed 1.

Live/work units are to be classified as _____ occupancies.

a. Group B
b. Group R-2
c. accessory
d. mixed

508.5.2 Occupancies. *Live/work units* shall be classified as a Group R-2 occupancy. Separation requirements found in Sections 420 and 508 shall not apply within the *live/work unit* where the *live/work unit* is in compliance with Section 508.5. Nonresidential uses that would otherwise be classified as either a Group H or S occupancy shall not be permitted in a *live/work unit*.

Exception: Storage shall be permitted in the *live/work unit* provided that the aggregate area of storage in the nonresidential portion of the *live/work unit* shall be limited to 10 percent of the space dedicated to nonresidential activities.

By definition, a transient residential dwelling unit or sleeping unit has a maximum occupancy period of _____ days.

a. 14
b. 30
c. 90
d. 180

[BG] TRANSIENT. Occupancy of a *dwelling unit* or *sleeping unit* for not more than 30 days.

In a Group E middle school, an assembly area associated with the Group E shall be classified as what occupancy?

a. Group E
b. Group A-5
c. Group I-1
d. Group U

303.1.3 Associated with Group E occupancies. A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.

In a building of Type IB construction, what is the minimum required fire-resistance rating of the floor construction?

a. 3 hours

b. 2 hours

c. 1 hour

d. 0 hours (no rating required)

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1 1/2[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	1 1/2	1	1	HT	1[b,c]	0

Where used in floor framing, solid sawn wood beams of Type IV-HT construction shall be of what minimum nominal size?

a. 4 inches by 8 inches

b. 4 inches by 10 inches

c. 6 inches by 10 inches

d. 8 inches by 10 inches

TABLE 2304.11
MINIMUM DIMENSIONS OF HEAVY TIMBER STRUCTURAL MEMBERS

		MINIMUM NOMINAL SOLID SAWN SIZE		MINIMUM GLUED-LAMINATED NET SIZE		MINIMUM STRUCTURAL COMPOSITE LUMBER NET SIZE	
SUPPORTING	HEAVY TIMBER STRUCTURAL ELEMENTS	Width, inch	Depth, inch	Width, inch	Depth, inch	Width, inch	Depth, inch
Floor loads only or combined floor and roof loads	Columns; Framed sawn or glued-laminated timber arches that spring from the floor line; Framed timber trusses	8	8	$6^{3}/_{4}$	$8^{1}/_{4}$	7	$7^{1}/_{2}$
	Wood beams and girders	6	10	5	$10^{1}/_{2}$	$5^{1}/_{4}$	$9^{1}/_{2}$
Roof loads only	Columns (roof and ceiling loads); Lower half of: wood-frame or glued-laminated arches that spring from the floor line or from grade	6	8	5	$8^{1}/_{4}$	$5^{1}/_{4}$	$7^{1}/_{2}$
	Upper half of: wood-frame or glued-laminated arches that spring from the floor line or from grade	6	6	5	6	$5^{1}/_{4}$	$5^{1}/_{2}$
	Framed timber trusses and other roof framing;[a] Framed or glued-laminated arches that spring from the top of walls or wall abutments	4[b]	6	3[b]	$6^{7}/_{8}$	$3^{1}/_{2}$[b]	$5^{1}/_{2}$

In a building of Type IIB construction, what is the minimum required fire-resistance rating of the roof construction?

a. 0 hours (no rating required) b. 1 hour

c. $1^1/_2$ hours d. 2 hours

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

What is the minimum required fire-resistance rating for interior bearing walls in a building of Type IV-A construction?

a. 3 hours
b. 2 hours
c. 1 hour
d. 0 hours (no rating required)

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1 1/2[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	1 1/2	1	1	HT	1[b,c]	0

In a Type IIIA building housing a Group A-1 occupancy, what is the minimum required rating for an exterior bearing wall located with a fire separation distance of 10 feet?

a. 3 hours

b. 2 hours

c. 1 hour

d. 0 hours (no rating required)

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

What is the minimum fire-resistive rating required for interior metal stud partitions in Type IIB construction?

a. 0, no rating is required
b. 1 hour
c. 2 hours
d. 3 hours

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

For an office building of Type IB construction, what is the minimum required fire-resistance rating for an exterior bearing wall located on an interior lot line?

a. 0, no rating is required
b. 1 hour
c. 2 hours
d. 3 hours

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	1½[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	1½	1	1	HT	1[b,c]	0

What is the minimum required fire-resistance rating for the floor construction in a Type IIIB building?

a. 2 hours

b. $1^1/_2$ hours

c. 1 hour

d. 0 hours (no rating required)

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

In a building of Type IV-A construction, floor assemblies that contain mass timber elements shall include a minimum of _____ inch(es) of noncombustible material above the mass timber.

a. $^{5}/_{8}$

b. $^{3}/_{4}$

c. 1

d. $1^{1}/_{2}$

602.4.1.3 Floors. The floor assembly shall contain a noncombustible material not less than 1 inch (25 mm) in thickness above the *mass timber*. Floor finishes in accordance with Section 804 shall be permitted on top of the noncombustible material. The underside of floor assemblies shall be protected in accordance with Section 602.4.1.2.

What is the minimum required fire-resistance rating for roof construction in a building of Type IA construction?

a. 0 hours (no rating required) b. 1 hour

c. $1^1/_2$ hours d. 2 hours

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	A	B	C	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

The maximum building area of a six-story single-occupancy building is limited to _____ times the allowable area permitted per story.

a. two
b. three
c. four
d. six

506.2 Allowable area determination. The allowable area of a building shall be determined in accordance with the applicable provisions of Sections 506.2.1, 506.2.2 and 506.3.

506.2.1 Single-occupancy buildings. The allowable area of each *story* of a single-occupancy building shall be determined in accordance with Equation 5-1:

$$A_a = A_t + (NS \times I_f) \qquad \textbf{(Equation 5-1)}$$

where:

A_a = Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S1, S13R or S13D value, as applicable) in accordance with Table 506.2.

NS = Tabular allowable area factor in accordance with Table 506.2 for nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage (percent) as calculated in accordance with Section 506.3.

The allowable area per story of a single-occupancy building with a maximum of three stories above grade shall be determined by Equation 5-1. The total allowable area of a single-occupancy building more than three *stories above grade plane* shall be determined in accordance with Equation 5-2:

$$A_a = [A_t + (NS \times I_f)] \times S_a \qquad \textbf{(Equation 5-2)}$$

where:

A_a = Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S13R, S13D or SM value, as applicable) in accordance with Table 506.2.

NS = Tabular allowable area factor in accordance with Table 506.2 for a nonsprinklered building (regardless of whether the building is sprinklered).

What is the maximum allowable height in feet above grade plane for a fully sprinklered single-occupancy Type IIA building housing a Group A-2 occupancy?

a. 55 feet
b. 65 feet
c. 75 feet
d. 85 feet

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE[a]

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Footnotes	Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A, B, E, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	270	180	85	85	70	60
H-1, H-2, H-3, H-5	NS[c, d]	UL	160	65	55	65	55	120	90	65	65	50	40
	S												
H-4	NS[c, d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	140	100	85	85	70	60
I-1 Condition 1, I-3	NS[d, e]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
I-1 Condition 2, I-2	NS[d, e, f]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85									
I-4	NS[d, g]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
R[h]	NS[d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S13D	60	60	60	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	270	180	85	85	70	60

The area of a mezzanine is not to be included in the determination of the _____.

a. fire area
b. building area
c. occupant load
d. plumbing fixture count

505.2 Mezzanines. A *mezzanine* or *mezzanines* in compliance with Section 505.2 shall be considered a portion of the *story* below. Such *mezzanines* shall not contribute to either the *building area* or number of *stories* as regulated by Section 503.1. The area of the *mezzanine* shall be included in determining the *fire area*. The clear height above and below the *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

In general, the aggregate area of mezzanines within a room is limited to _____ of the area of the room in which the mezzanines are located.

a. 10 percent
b. 25 percent
c. $33^{1}/_{3}$ percent
d. 50 percent

505.2.1 Area limitation. The aggregate area of a *mezzanine* or *mezzanines* within a room shall be not greater than one-third of the floor area of that room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the *mezzanine* is located. In determining the allowable *mezzanine* area, the area of the *mezzanine* shall not be included in the floor area of the room.

An allowable area increase for frontage is not permitted unless a minimum of _____ of the building perimeter is sufficiently open.

a. 10 percent

b. 25 percent

c. $33^{1}/_{3}$ percent

d. 40 percent

506.3 Frontage increase. Every building shall adjoin or have access to a *public way* to receive an area factor increase based on frontage. Area factor increase shall be determined in accordance with Sections 506.3.1 through 506.3.3.

506.3.1 Minimum percentage of perimeter. To qualify for an area factor increase based on frontage, a building shall have not less than 25 percent of its perimeter on a *public way* or open space. Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved *fire lane*.

TABLE 506.3.3
FRONTAGE INCREASE FACTOR[a]

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)		
	0 to less than 20	20 to less than 25	25 to less than 30
0 to less than 25	0	0	0
25 to less than 50	0	0.17	0.21
50 to less than 75	0	0.33	0.42
75 to 100	0	0.50	0.63

What is frontage: https://www.youtube.com/watch?v=ep0uyHinlKc

What is the allowable tabular height, in number of stories above grade plane, for a Group R-1 single-occupancy building of Type IIB construction where the building is protected by an NFPA 13R sprinkler system?

a. 3

b. 4

c. 5

d. 6

TABLE 504.4—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b]

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Footnotes	Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3

What is the maximum allowable number of stories above grade plane permitted for a single-occupancy Type IIIA building housing a Group R-2 occupancy that is provided with a 13R sprinkler system throughout?

a. 2

b. 3

c. 4

d. 5

TABLE 504.4—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b]

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Footnotes	Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-2[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4	4								4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

A complying Group H-2 aircraft paint hangar may be unlimited in floor area when limited to one story, provided the hangar is surrounded by yards or public ways having a minimum width of _____.

a. 40 feet

b. 60 feet

c. twice the height of the hangar

d. one and one-half times the height of the hangar

507.10 Aircraft paint hangar. The area of a Group H-2 aircraft paint hangar not more than one *story above grade plane* shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.5 and is surrounded and adjoined by *public ways* or *yards* not less in width than one and one-half times the *building height*.

In order for a Type IIIB office building to be considered for unlimited area under Section 507, it must be limited to a maximum height of _____ above grade plane.

a. one story
b. two stories
c. 50 feet
d. 40 feet

507.5 Two-story buildings. The area of a Group B, F, M or S building not more than two *stories* *above grade plane* shall not be limited where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

A nine-story apartment building of Type IIA construction, where permitted, shall be located a minimum of _____ feet from any other building on the lot and from all lot lines.

a. 10 feet
b. 30 feet
c. 50 feet
d. 60 feet

510.6 Group R-1 and R-2 buildings of Type IIA construction. The height limitation for buildings of Type IIA construction in Groups R-1 and R-2 shall be increased to nine *stories* and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the *lot* and from *lot lines*, the *exits* are segregated in an area enclosed by a 2-hour fire-resistance-rated *fire wall* and the first floor assembly has a *fire-resistance rating* of not less than $1^1/_2$ hours.

An opening around a penetrating item is a(n) _____.

a. annular space
b. penetration
c. through penetration
d. joint

[BF] ANNULAR SPACE. The opening around the penetrating item.

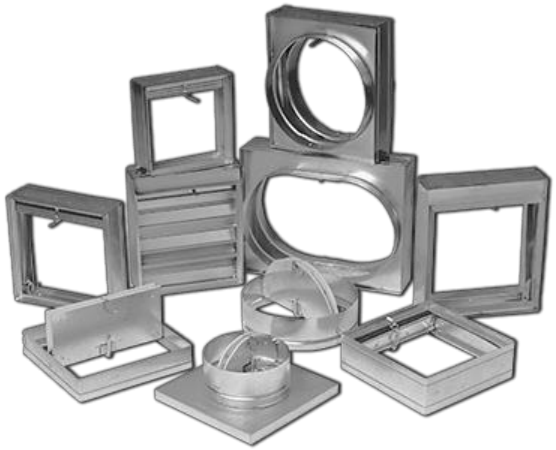
A _____ is a listed device installed in a ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly to limit automatically the radiative heat transfer through an air inlet/outlet opening.

a. horizontal fire damper

b. ceiling radiation damper

c. combination fire/smoke damper

d. horizontal access door



[BF] CEILING RADIATION DAMPER. A *listed* device installed in a ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly to limit automatically the radiative heat transfer through an air inlet/outlet opening. Ceiling radiation dampers include air terminal units, ceiling dampers and ceiling air diffusers. Ceiling radiation dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in dynamic systems that continue to operate during a fire. A dynamic ceiling radiation damper is tested and rated for closure under elevated temperature airflow.

The time period that a through-penetration firestop system or perimeter fire containment system limits the spread of fire through a penetration or void is considered _____.

a. a fire protection rating

b. an F rating

c. a T rating

d. a fire-resistance rating

[BF] F RATING. The time period that the *through-penetration firestop system or perimeter fire containment system* limits the spread of fire through the penetration or void.

[BF] FIRE PROTECTION RATING. The period of time that an opening protective will maintain the ability to confine a fire as determined by tests specified in Section 716. Ratings are stated in hours or minutes.

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

[BF] T RATING. The time period that the *penetration firestop system*, including the penetrating item, limits the maximum temperature rise to 325°F (163°C) above its initial temperature through the penetration on the nonfire side when tested in accordance with ASTM E814 or UL 1479.

_____ consists of building materials installed to resist the free passage of flame to other areas of the building through concealed spaces.

a. Draftstopping
b. Fireblocking
c. Firestopping
d. Opening protectives

[BF] FIREBLOCKING. Building materials, or materials *approved* for use as fireblocking, installed to resist the free passage of flame to other areas of the building through concealed spaces.

The measurement between the face of an exterior wall and the closest interior lot line is described as the _____.

a. fire separation distance
b. fire exposure setback
c. clearance to construction
d. exterior fire exposure

[BF] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. The closest interior *lot line*.
2. To the centerline of a street, an alley or *public way*.
3. To an imaginary line between two buildings on the lot.

The distance shall be measured at right angles from the face of the wall.

A _____ must have sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

a. fire wall
b. fire separation wall
c. fire barrier
d. smoke barrier

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

Projections beyond an exterior wall are permitted where the exterior wall has a minimum fire separation distance of _____ inches.

a. 12 b. 24

c. 30 d. 36

TABLE 705.2
MINIMUM DISTANCE OF PROJECTION

FIRE SEPARATION DISTANCE (FSD) (feet)	MINIMUM DISTANCE FROM LINE USED TO DETERMINE FSD
0 to less than 2	Projections not permitted
2 to less than 3	24 inches
3 to less than 5	Two-thirds of FSD
5 or greater	40 inches

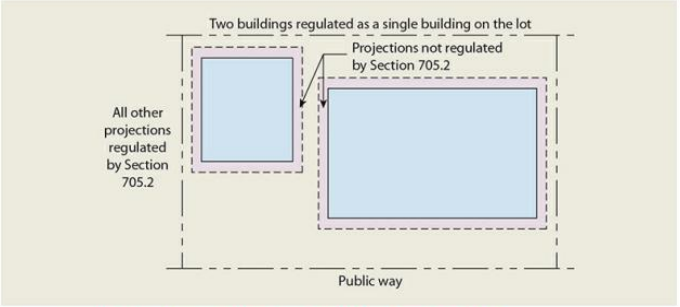


Figure 705-1 **Two buildings regulated as a single building on the lot.**

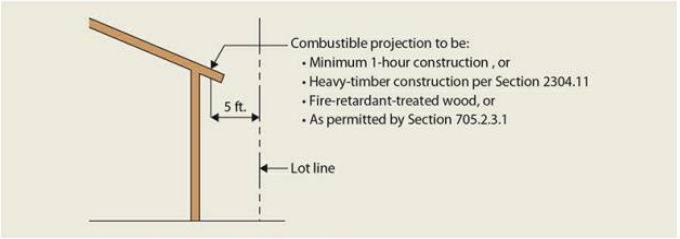


Figure 705-2 **Protection of combustible projections.**

Architectural considerations quite often call for projections from exterior walls such as cornices, eave overhangs, and balconies.

In a fully-sprinklered Type IIB office building, what is the maximum allowable area of unprotected exterior wall openings for a fire separation distance of 5 feet?

a. 10 percent

b. 15 percent

c. 25 percent

d. unprotected openings are prohibited

TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c, k]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted[k]
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted[k]
	Protected (P)	Not Permitted[k]
3 to less than 5[d, e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	15%
	Protected (P)	15%
5 to less than 10[e, f, j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%
10 to less than 15[e, f, g, j]	Unprotected, Nonsprinklered (UP, NS)	15%[h]
	Unprotected, Sprinklered (UP, S)[i]	45%
	Protected (P)	45%

705.8.5 Vertical separation of openings. Openings in *exterior walls* in adjacent *stories* shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet (1524 mm) of each other horizontally and the opening in the lower *story* is not a protected opening with a *fire protection rating* of not less than $^{3}/_{4}$ hour. Such openings shall be

Where flame barriers are required for the vertical separation of exterior openings in adjacent stories, horizontal barriers must extend at least _____ inches beyond the exterior wall.

a. 12

b. 24

c. 30

d. 36

705.8.5 Vertical separation of openings. Openings in *exterior walls* in adjacent *stories* shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet (1524 mm) of each other horizontally and the opening in the lower *story* is not a protected opening with a *fire protection rating* of not less than $^{3}/_{4}$ hour. Such openings shall be separated vertically not less than 3 feet (914 mm) by spandrel girders, *exterior walls* or other similar assemblies that have a *fire-resistance rating* of not less than 1 hour, rated for exposure to fire from both sides, or by flame barriers that extend horizontally not less than 30 inches (762 mm) beyond the *exterior wall*. Flame barriers shall have a *fire-resistance rating* of not less than 1 hour. The unexposed surface temperature limitations specified in ASTM E119 or UL 263 shall not apply to the flame barriers unless otherwise required by the provisions of this code.

Flame barriers protecting openings in exterior walls in adjacent stories shall have a minimum fire-resistance rating of _____.

a. 20 minutes
b. 45 minutes
c. 1 hour
d. 2 hours

705.8.5 Vertical separation of openings. Openings in *exterior walls* in adjacent *stories* shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet (1524 mm) of each other horizontally and the opening in the lower *story* is not a protected opening with a *fire protection rating* of not less than $^{3}/_{4}$ hour. Such openings shall be separated vertically not less than 3 feet (914 mm) by spandrel girders, *exterior walls* or other similar assemblies that have a *fire-resistance rating* of not less than 1 hour, rated for exposure to fire from both sides, or by flame barriers that extend horizontally not less than 30 inches (762 mm) beyond the *exterior wall*. Flame barriers

A parapet is not required on the exterior wall of a nonsprinklered building located a minimum of _____ feet from an interior lot line.

a. 5
b. 10
c. 15
d. 20

705.11 Parapets. Parapets shall be provided on *exterior walls* of buildings.

Exceptions: A parapet need not be provided on an *exterior wall* where any of the following conditions exist:

6. Where the wall is permitted to have not less than 25 percent of the *exterior wall* areas containing unprotected openings based on *fire separation distance* as determined in accordance with Section 705.8.

705.8.1 Allowable area of openings. The maximum area of unprotected and protected openings permitted in an *exterior wall* in any *story* of a building shall not exceed the percentages specified in Table 705.8 based on the *fire separation distance* of each individual story.

Exceptions:

1. In other than Group H occupancies, unlimited unprotected openings are permitted in the first *story above grade plane* where the wall faces one of the following:
   1.1. A street and has a *fire separation distance* of more than 15 feet (4572 mm).
   1.2. An unoccupied space. The unoccupied space shall be on the same lot or dedicated for public use, shall be not less than 30 feet (9144 mm) in width and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.

Where an exterior bearing wall of a Group M occupancy of Type IIB construction is located 3 feet from an interior lot line, the wall must have a minimum fire-resistance rating of _____ hour(s).

a. 0 hours (no rating required) b. 1

c. 2 d. 3

TABLE 705.5
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE[a, d, g]

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H[e]	OCCUPANCY GROUP F-1, M, S-1[f]	OCCUPANCY GROUP A, B, E, F-2, I, R[i], S-2, U[h]
X < 5[b]	All	3	2	1
5 ≤ X < 10	IA, IVA	3	2	1
	Others	2	1	1
10 ≤ X < 30	IA, IB, IVA, IVB	2	1	1[c]
	IIB, VB	1	0	0
	Others	1	1	1[c]
X ≥ 30	All	0	0	0

Embedded ends of combustible members entering masonry or concrete fire walls shall be separated a minimum distance of _____ inch(es).

a. 1

b. 2

c. 4

d. 6

706.7 Combustible framing in fire walls. Adjacent combustible members entering into a concrete or masonry *fire wall* from opposite sides shall not have less than a 4-inch (102 mm) distance between embedded ends. Where combustible members frame into hollow walls or walls of hollow units, hollow spaces shall be solidly filled for the full thickness of the wall and for a distance not less than 4 inches (102 mm) above, below and between the structural members, with noncombustible materials *approved* for *fireblocking*.

The aggregate width of openings in a fire wall is limited to a maximum of _____ of the length of the wall.

a. 10 percent
b. 25 percent
c. $33^{1}/_{3}$ percent
d. 50 percent

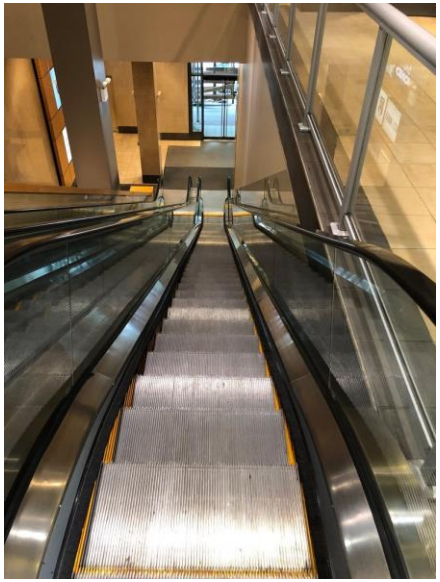
706.8 Openings. Each opening through a *fire wall* shall be protected in accordance with Section 716 and shall not exceed 156 square feet (15 m^2). The aggregate width of openings at any floor level shall not exceed 25 percent of the length of the wall.

Where vertical openings are created for an escalator system in a fully sprinklered hotel, special opening protection methods are established , other than automatic shutters, where the openings connect a maximum of _____ stories.

a. two
b. three
c. four
d. six

712.1.3 Escalator openings. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, vertical openings for escalators shall be permitted where protected in accordance with Section 712.1.3.1 or 712.1.3.2.

712.1.3.1 Opening size. Protection by a draft curtain and closely spaced sprinklers in accordance with NFPA 13 shall be permitted where the area of the vertical opening between *stories* does not exceed twice the horizontal projected area of the escalator. In other than Groups B and M, this application is limited to openings that do not connect more than four *stories*.



What is the minimum required fire-resistance rating for a fire partition separating sleeping units in a Group I-1 occupancy housed in a Type IIA building?

a. 20 minutes
b. 30 minutes
c. 1 hour
d. no rating is required

708.3 Fire-resistance rating. *Fire partitions* shall have a *fire-resistance rating* of not less than 1 hour.

Exceptions:

1. *Corridor* walls permitted to have a $^1/_2$-hour *fire-resistance rating* by Table 1020.2.
2. *Dwelling unit* and *sleeping unit* separations in buildings of Types IIB, IIIB and VB construction shall have *fire-resistance ratings* of not less than $^1/_2$ hour in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

. In which one of the following types of construction must a smoke barrier be supported by fire-resistance-rated construction having at least an equivalent rating to the smoke barrier supported?

a. Type IIB
b. Type IIIA
c. Type IIIB
d. Type VB

709.4 Continuity. *Smoke barriers* shall form an effective membrane continuous from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction. *Smoke-barrier* walls used to separate *smoke compartments* shall comply with Section 709.4.1. *Smoke-barrier* walls used to enclose *areas of refuge* in accordance with Section 1009.6.4 or to enclose elevator lobbies in accordance with Section 405.4.3, 3007.6.2, or 3008.6.2 shall comply with Section 709.4.2.

. In which one of the following types of construction must a smoke barrier be supported by fire-resistance-rated construction having at least an equivalent rating to the smoke barrier supported?

a. Type IIB
b. Type IIIA
c. Type IIIB
d. Type VB

709.4 Continuity. *Smoke barriers* shall form an effective membrane continuous from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction. *Smoke-barrier* walls used to separate *smoke compartments* shall comply with Section 709.4.1. *Smoke-barrier* walls used to enclose *areas of refuge* in accordance with Section 1009.6.4 or to enclose elevator lobbies in accordance with Section 405.4.3, 3007.6.2, or 3008.6.2 shall comply with Section 709.4.2.

Automatic shutters utilized to protect escalator openings between stories shall have a minimum fire-resistance rating of _____.

a. 45 minutes

b. 1 hour

c. $1^1/_2$ hours

d. 2 hours

712.1.3.2 Automatic shutters. Protection of the vertical opening by approved shutters at every penetrated floor shall be permitted in accordance with this section. The shutters shall be of noncombustible construction and have a *fire-resistance rating* of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3.1 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release therefrom.

A fire door assembly in a 1-hour fire barrier used in an interior exit stairway enclosure shall have a minimum fire protection rating of _____ hour.

a. 1/3

b. 1/2

c. 3/4

d. 1

TABLE 716.1(2)—continued
OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b,c]	MINIMUM SIDELIGHT/ TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1	1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60

Where an elevator lobby is used to provide hoistway protection required in a non-sprinklered building, it shall be separated from the floor level through the use of _____ .

a. smoke barriers
b. fire barriers
c. fire partitions
d. smoke partitions

3006.3 Hoistway opening protection. Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:

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

AC 048 - Elevator Hoistway Protection - YouTube

Egress Through Elevator Smoke Protective Curtains - Maxson Associates

In which one of the following locations may self-closing or automatic-closing devices be omitted from required fire doors?

a. Group E corridor doors

b. doors in common walls separating Group R-1 sleeping units

c. doors between interior exit stairways and exit passageways

d. Group I-2 smoke barrier doors

716.2.6 Fire door hardware and closures. *Fire door* hardware and closures shall be installed on *fire door assemblies* in accordance with the requirements of this section.

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.

Where automatic-closing fire doors are installed, which one of the following locations does not require closing upon actuation of smoke detectors?

a. cross-corridor doors in an office building

b. doors in a fire barrier separating control areas

c. a pair of doors installed in a fire wall

d. a single door installed in a smoke partition

716.2.6.6 Smoke-activated doors. Automatic-closing doors installed in the following locations shall be permitted to have hold-open devices. Doors shall automatically close by the actuation of *smoke detectors* installed in accordance with Section 907.3 or by loss of power to the smoke *detector* or hold-open device.

Doors that are automatic-closing by smoke detection shall not have more than a 10-second delay before the door starts to close after the smoke detector is actuated. Automatic-closing doors that protect openings installed in the following locations shall comply with this section:

1. In walls that separate incidental uses in accordance with Section 509.4.
2. In *fire walls* in accordance with Section 706.8.
3. In *fire barriers* in accordance with Section 707.6.
4. In *fire partitions* in accordance with Section 708.6.
5. In *smoke barriers* in accordance with Section 709.5.
6. In *smoke partitions* in accordance with Section 710.5.2.3.
7. In *shaft enclosures* in accordance with Section 713.7.
8. In waste and linen chutes, discharge openings and access and discharge rooms in accordance with Section 713.13. Loading doors installed in waste and linen chutes shall meet the requirements of Sections 716.2.6.1 and 716.2.6.3.

Access openings for waste or linen chutes shall be located in rooms enclosed by minimum _____ fire barriers.

a. 1

b. $1^1/_2$

c. 2

d. 3

713.13.3 Chute access rooms. Access openings for waste, recycling or linen chutes shall be located in rooms or compartments enclosed by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. Openings into the access rooms shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour. Doors shall be self- or automatic-closing upon the detection of smoke in accordance with Section 716.2.6.6. The room or compartment shall be configured to allow the access door to the room or compartment to close and latch with the access panel to the chute in any position.

What is the minimum required fire-protection rating for a fire window assembly located in a 2-hour fire barrier?

a. $^{3}/_{4}$ hour

b. 1 hour

c. $1^{1}/_{2}$ hours

d. fire windows are not permitted

TABLE 716.1(3)
FIRE WINDOW ASSEMBLY FIRE PROTECTION RATINGS

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE-RATED GLAZING MARKING
Interior walls			
Fire walls	All	NP[a]	W-XXX[b]
Fire barriers	>1	NP[a]	W-XXX[b]
	1	NP[a]	W-XXX[b]
Atrium separations (Section 707.3.6), Incidental use areas (Section 707.3.7),[c] Mixed occupancy separations (Section 707.3.9)	1	$^{3}/_{4}$	OH-45 or W-60
Fire partitions	1	$^{3}/_{4}$	OH-45 or W-60
	0.5	$^{1}/_{3}$	OH-20 or W-30
Smoke barriers	1	$^{3}/_{4}$	OH-45 or W-60
Exterior walls	>1	$1^{1}/_{2}$	OH-90 or W-XXX[b]
	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Party wall	All	NP	Not Applicable

NP = Not Permitted.

Fire window assemblies identified with a fire-rated glazing marking of OH-45 or W-60 are permitted for use in all but which one of the following wall assemblies?

a. incidental use areas

b. smoke barriers

c. 2-hour fire barriers

d. 1-hour fire partitions

[Fyre-Tec Fire Rated Windows - YouTube]

TABLE 716.1(3)
FIRE WINDOW ASSEMBLY FIRE PROTECTION RATINGS

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE-RATED GLAZING MARKING
Interior walls			
Fire walls	All	NP[a]	W-XXX[b]
Fire barriers	>1	NP[a]	W-XXX[b]
	1	NP[a]	W-XXX[b]
Atrium separations (Section 707.3.6), Incidental use areas (Section 707.3.7),[c] Mixed occupancy separations (Section 707.3.9)	1	3/4	OH-45 or W-60
Fire partitions	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Smoke barriers	1	3/4	OH-45 or W-60
Exterior walls	>1	1 1/2	OH-90 or W-XXX[b]
	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Party wall	All	NP	Not Applicable

The maximum spacing of fireblocking within concealed spaces of exterior architectural elements erected with combustible framing shall be _____ feet.

a. 10

b. 20

c. 60

d. 100

718.2.6 Exterior wall coverings. *Fireblocking* shall be installed within concealed spaces of *exterior wall coverings* and other exterior architectural elements where permitted to be of combustible construction as specified in Section 1405 or where erected with combustible frames. *Fireblocking* shall be installed at maximum intervals of 20 feet (6096 mm) in either dimension so that there will be no concealed space exceeding 100 square feet (9.3 m^2) between *fireblocking*. Where wood furring strips are used, they shall be of *approved* wood of natural decay resistance or *preservative-treated wood*. If noncontinuous, such elements shall have closed ends, with not less than 4 inches (102 mm) of separation between sections.

Other than for cellulose loose-fill insulation that is not spray applied, the maximum flame spread index of insulating materials concealed within a Type II building shall be _____ .

a. 25
b. 50
c. 75
d. unlimited

720.2 Concealed installation. Insulating materials, where concealed as installed in buildings of any type of construction, shall have a *flame spread index* of not more than 25 and a *smoke-developed index* of not more than 450.

Where wood sleepers are installed for the installation of wood flooring in a church sanctuary, the maximum size of any open spaces under the flooring shall be _____ square feet unless the entire underfloor space is filled with an approved material.

a. 10

b. 20

c. 100

d. 144

718.2.7 Concealed sleeper spaces. Where wood sleepers are used for laying wood flooring on masonry or concrete fire-resistance-rated floors, the space between the floor slab and the underside of the wood flooring shall be filled with an *approved* material to resist the free passage of flame and products of combustion or fireblocked in such a manner that open spaces under the flooring shall not exceed 100 square feet (9.3 m^2) in area and such space shall be filled solidly under permanent partitions so that communication under the flooring between adjoining rooms shall not occur.

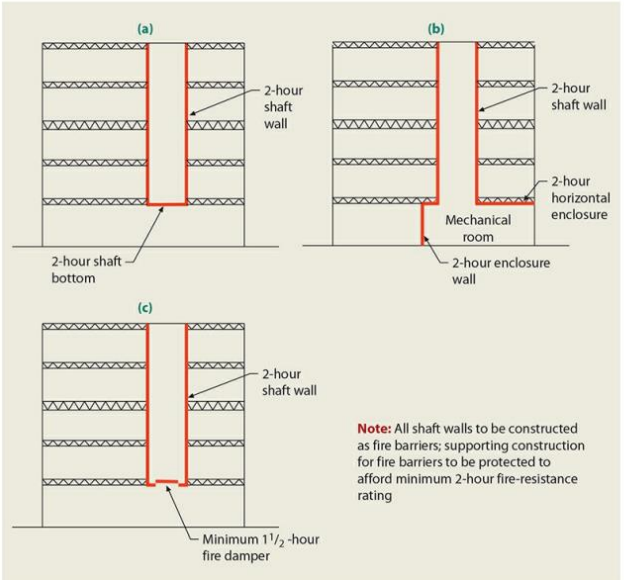
Exceptions:

1. *Fireblocking* is not required for slab-on-grade floors in gymnasiums.
2. *Fireblocking* is required only at the juncture of each alternate lane and at the ends of each lane in a bowling facility.

Shaft enclosures are to be constructed as _____ or horizontal assemblies, or both.

a. fire partitions
b. fire barriers
c. fire walls
d. smoke barriers

713.2 Construction. *Shaft enclosures* shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* in accordance with Section 711, or both.



Which one of the following types of standpipe systems requires water from a fire department pumper to be pumped into the system in order to supply the system demand?

a. automatic dry

b. automatic wet

c. manual wet

d. semi-automatic dry

[F] STANDPIPE, TYPES OF. Standpipe types are as follows:

Automatic dry. A dry standpipe system, normally filled with pressurized air, that is arranged through the use of a device, such as dry pipe valve, to admit water into the system piping *automatically* upon the opening of a hose valve. The water supply for an *automatic* dry standpipe system shall be capable of supplying the system demand.

Automatic wet. A wet standpipe system that has a water supply that is capable of supplying the system demand *automatically*.

Manual dry. A dry standpipe system that does not have a permanent water supply attached to the system. Manual dry standpipe systems require water from a fire department pumper to be pumped into the system through the fire department connection in order to meet the system demand.

Manual wet. A wet standpipe system connected to a water supply for the purpose of maintaining water within the system but does not have a water supply capable of delivering the system demand attached to the system. Manual-wet standpipe systems require water from a fire department pumper (or the like) to be pumped into the system in order to meet the system demand.

Semiautomatic dry. A dry standpipe system that is arranged through the use of a device, such as a deluge valve, to admit water into the system piping upon activation of a remote control device located at a hose connection. A remote control activation device shall be provided at each hose connection. The water supply for a semiautomatic dry standpipe system shall be capable of supplying the system demand.

A stadium press box in a Group A-5 occupancy having a maximum floor area of _____ square feet need not be sprinklered.

a. 400
b. 1,000
c. 5,000
d. 12,000

[F] 903.2.1.5 Group A-5. An *automatic sprinkler system* shall be provided for all enclosed Group A-5 accessory use areas in excess of 1,000 square feet (93 m^2).

A sprinkler system is required for Group E fire areas having a minimum floor area of _____ square feet.

a. 2,501
b. 5,001
c. 12,001
d. 20,001

[F] 903.2.3 Group E. An *automatic sprinkler system* shall be provided for Group E occupancies as follows:

1. Throughout all Group E *fire areas* greater than 12,000 square feet (1115 m^2) in area.
2. The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

   Exception: In buildings where every classroom has not fewer than one exterior *exit* door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area.

A building shall be fully sprinklered where the combined area of all Group S-1 fire areas exceeds _____ square feet.

a. 2,500
b. 5,000
c. 12,000
d. 24,000

[F] 903.2.9 Group S-1. An *automatic sprinkler system* shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group S-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group S-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).

A single-story above grade plane Group S-1 repair garage need not be fully sprinklered where the fire area contains a maximum of _____ square feet.

a. 2,500
b. 10,000
c. 12,000
d. 24,000

[F] 903.2.9.1 Repair garages. An *automatic sprinkler system* shall be provided throughout all buildings used as *repair garages* in accordance with Section 406, as shown:

1. Buildings having two or more *stories above grade plane*, including basements, with a *fire area* containing a *repair garage* exceeding 10,000 square feet (929 m^2).
2. Buildings not more than one *story above grade plane*, with a *fire area* containing a *repair garage* exceeding 12,000 square feet (1115 m^2).
3. Buildings with *repair garages* servicing vehicles parked in basements.
4. A Group S-1 *fire area* used for the repair of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m^2).

An NFPA 13D sprinkler system is permitted to be installed in all but which one of the following uses?

a. townhouse
b. Group R-3
c. Group R-4, Condition 1
d. Group R-2

[F] 903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one- and two-family *dwellings*; Group R-3; Group R-4, Condition 1; and *townhouses* shall be permitted to be installed throughout in accordance with NFPA 13D.

Limited area sprinkler systems are only permitted to protect areas classified as _____.

a. Light Hazard
b. Light Hazard or Ordinary Hazard Group 1
c. Ordinary Hazard Group 1 or 2
d. Light Hazard, Ordinary Hazard Group 1 or Ordinary Hazard Group 2

[F] 903.3.8 Limited area sprinkler systems. Limited area sprinkler systems shall be in accordance with the standards listed in Section 903.3.1 except as provided in Sections 903.3.8.1 through 903.3.8.5.

903.3.8.1 Number of sprinklers. Limited area sprinkler systems shall not exceed six sprinklers in any single *fire area*.

903.3.8.2 Occupancy hazard classification. Only areas classified by NFPA 13 as Light Hazard or Ordinary Hazard Group 1 shall be permitted to be protected by limited area sprinkler systems.

903.3.8.3 Piping arrangement. Where a limited area sprinkler system is installed in a building with an automatic wet standpipe system, sprinklers shall be supplied by the standpipe system. Where a limited area sprinkler system is installed in a building without an automatic wet standpipe system, water shall be permitted to be supplied by the plumbing system provided that the plumbing system is capable of simultaneously supplying domestic and sprinkler demands.

903.3.8.4 Supervision. Control valves shall not be installed between the water supply and sprinklers unless the valves are of an *approved* indicating type that are supervised or secured in the open position.

903.3.8.5 Calculations. Hydraulic calculations in accordance with NFPA 13 shall be provided to demonstrate that the available water flow and pressure are adequate to supply all sprinklers installed in any single *fire area* with discharge densities corresponding to the hazard classification.

A manual fire alarm system is not required in a Group E occupancy with a maximum occupant load of _____ persons.

a. 30
b. 50
c. 300
d. 500

[F] 907.2.3 Group E. A manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies. Where *automatic sprinkler systems* or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

Exceptions:

1. A manual fire alarm system shall not be required in Group E occupancies with an *occupant load* of 50 or less.

. Where smoke and heat vents operated by fusible links are installed in areas protected by automatic fire sprinklers, the fusible link shall have a temperature rating of _____ F.

a. 250°
b. 320°
c. 360°
d. 400°

[F] 910.3.5 Fusible link temperature rating. Where vents are installed in areas provided with automatic fire sprinklers and the vents operate by fusible link, the fusible link shall have a temperature rating of 360°F (182°C).

A fire command center is required in Group F-1 and S-1 occupancies with a minimum building footprint of _____ square feet.

a. 250,001
b. 500,001
c. 600,001
d. 750,001

[F] 911.1 General. Where required by other sections of this code, in buildings classified as high-rise buildings by this code and in all F-1 and S-1 occupancies with a building footprint of over 500,000 square feet (46 452 m^2), a fire command center for fire department operations shall be provided and shall comply with Sections 911.1.1 through 911.1.7.

Schedule

Week	Dates	Class Subject
10	Oct 24	Sections 1010 through 1012 and 1014— Means of Egress II
11	Oct 31	Sections 1006, 1007 and 1016 through 1021— Means of Egress III
12	Nov 7	Sections 1022 through 1031—Means of Egress IV
13	Nov 14	Chapter 11—Accessibility, Chapter 4—Special Detailed Requirements Based on Use and Occupancy
14	Nov 21	Chapters 14, 15 and 18— Exterior Wall Coverings, Roofs and Foundations
15	Nov 28	Chapters 16, 17, 19, 21, 22 and 23— Special Inspections, Concrete, Masonry and Wood, Chapters 24 and 26—Glazing, Skylights and Plastics
16	Dec 5	Final Review (Final)

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

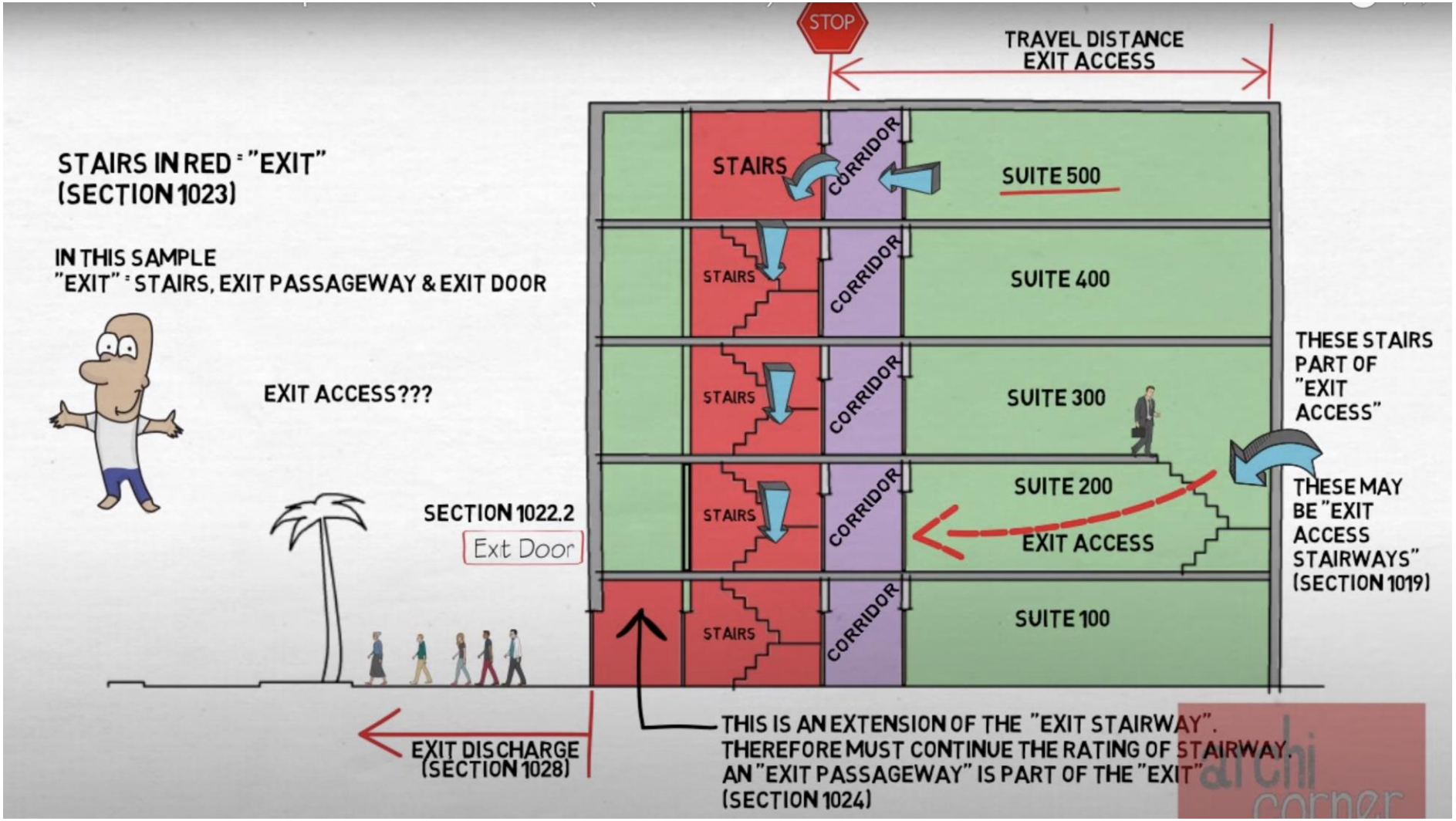
Source: 2021 IBC

Chapter Overview

Exit Access
Exit
Exit Discharge
Special Attention

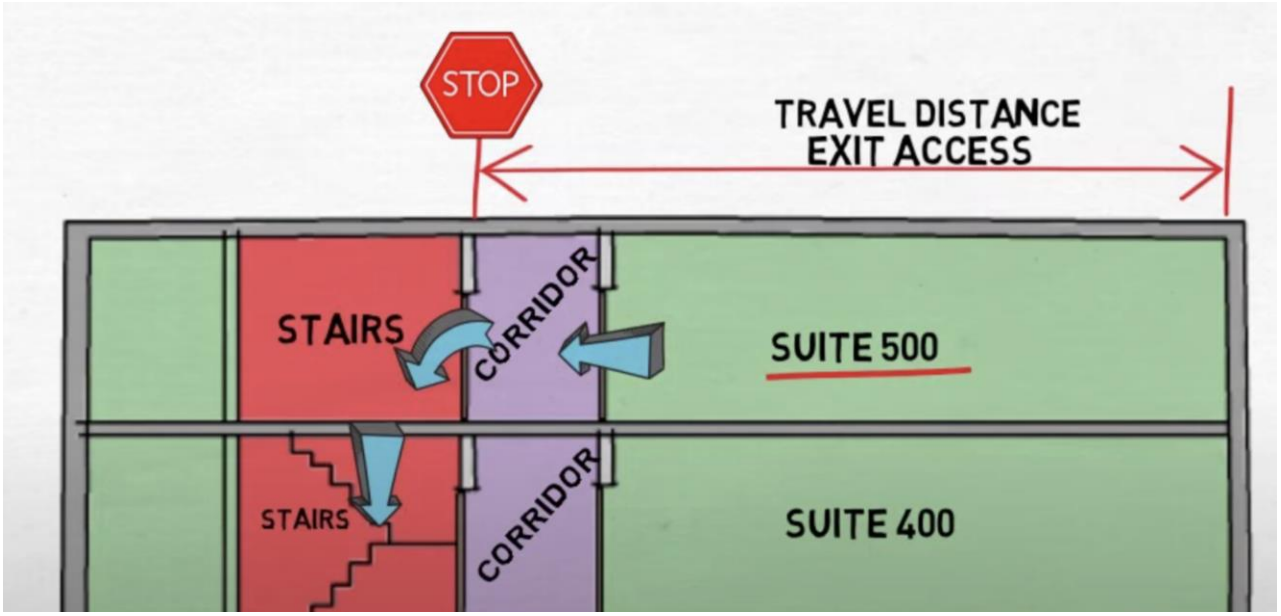
Source: 2021 IBC

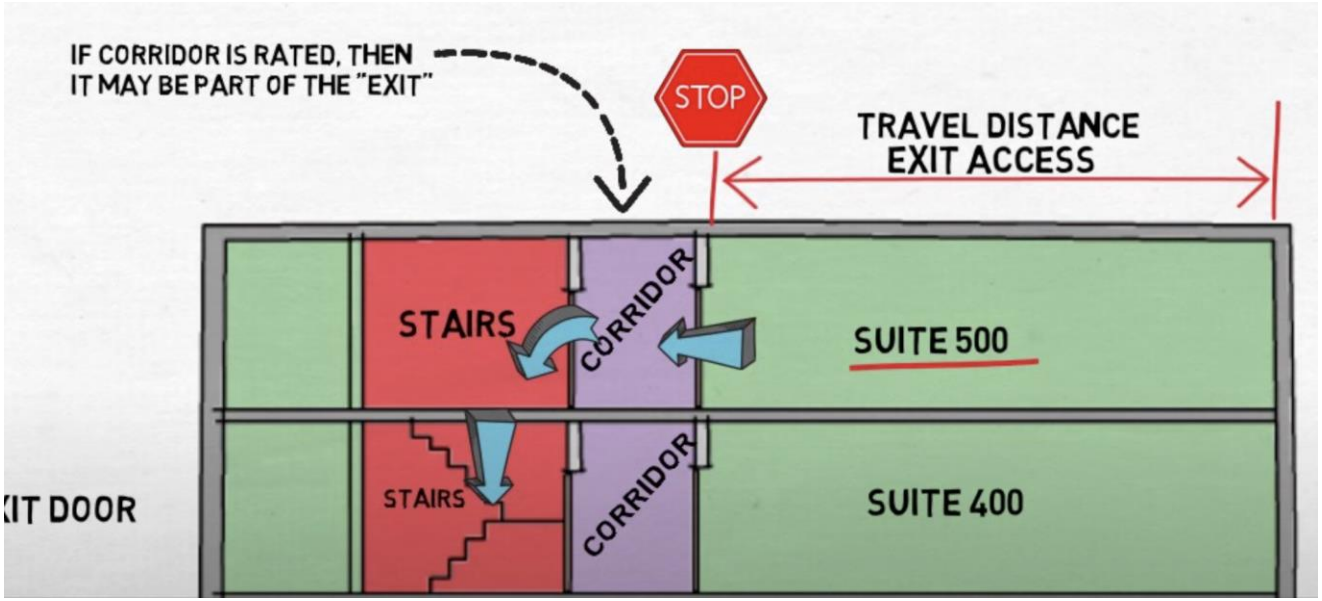
What is egress



Source: archicorner

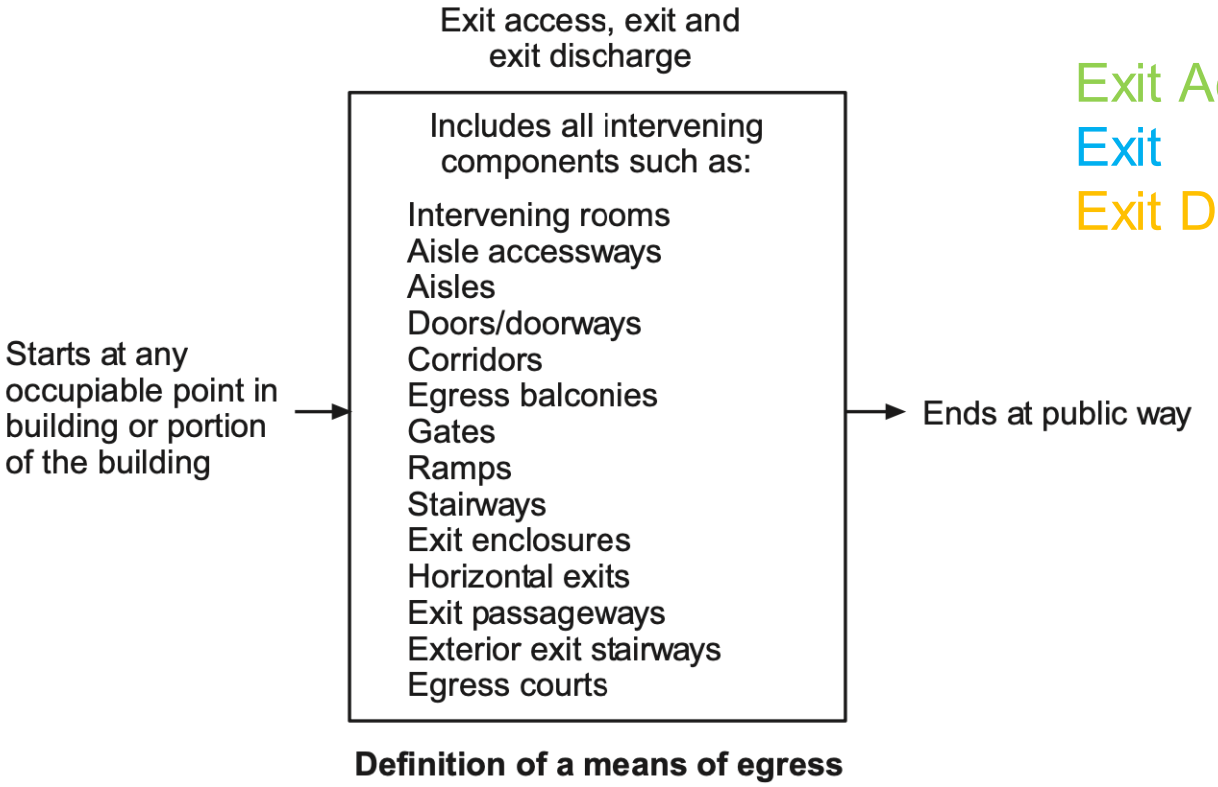
What is exit access vs exit





Source: archicorner

1001.1 General



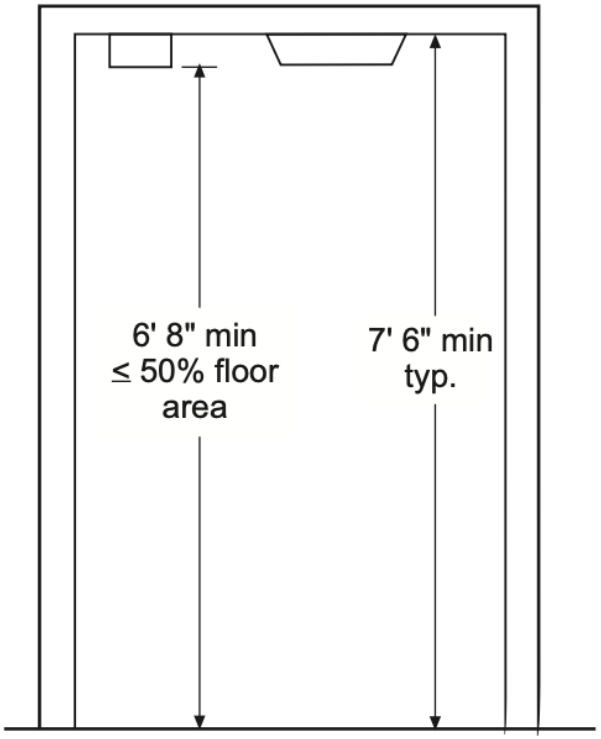
Definition of a means of egress

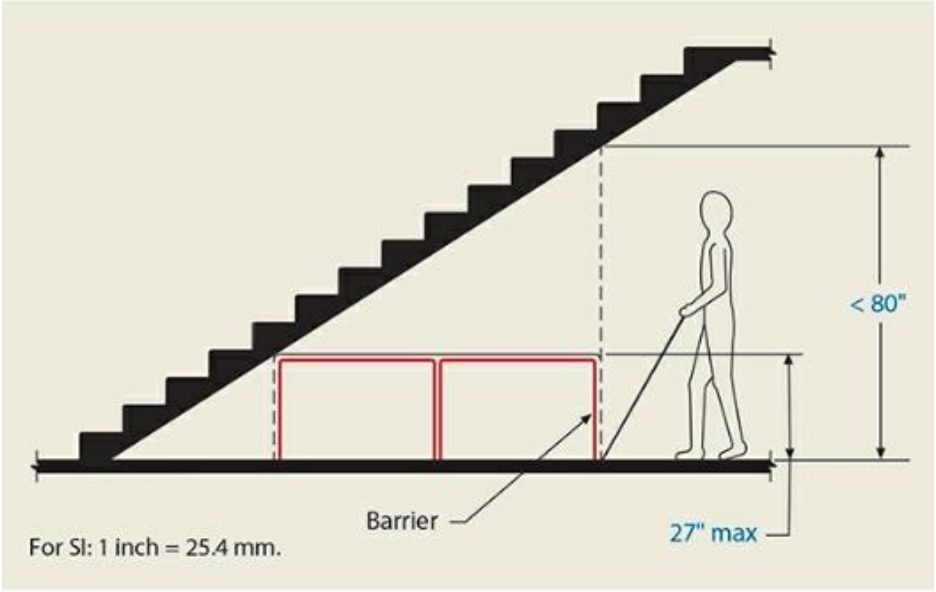
Building components along the path of egress travel might include aisle accessways, aisles, doors or doorways, intervening rooms, gates, corridors, ramps, exit access stairways, interior exit stairways, exit passageways, horizontal exits, exterior balconies, exterior exit stairways and egress courts.

Source: 2021 IBC

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

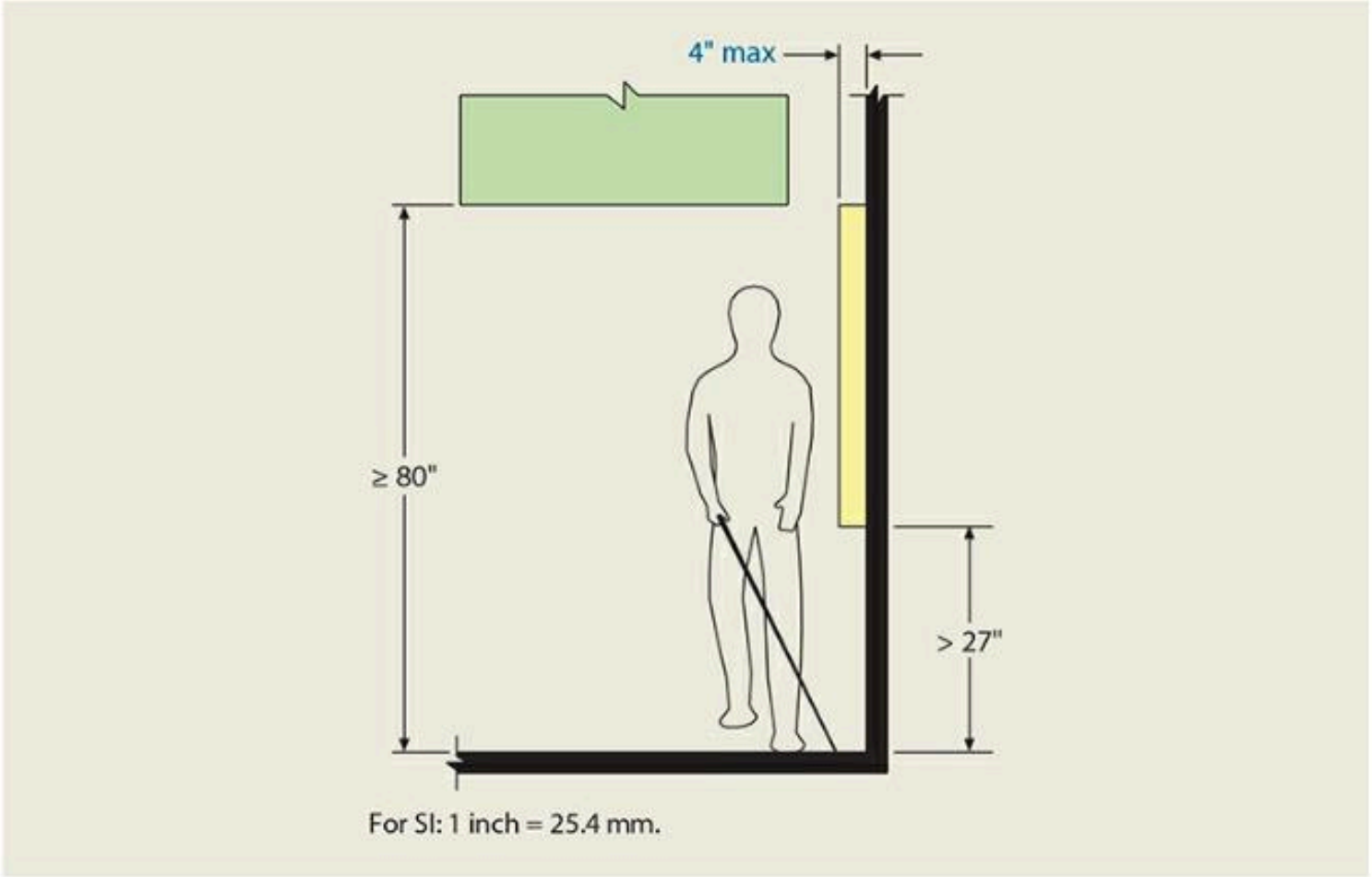


Figure 1003-4 **Limits of protruding objects.**

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

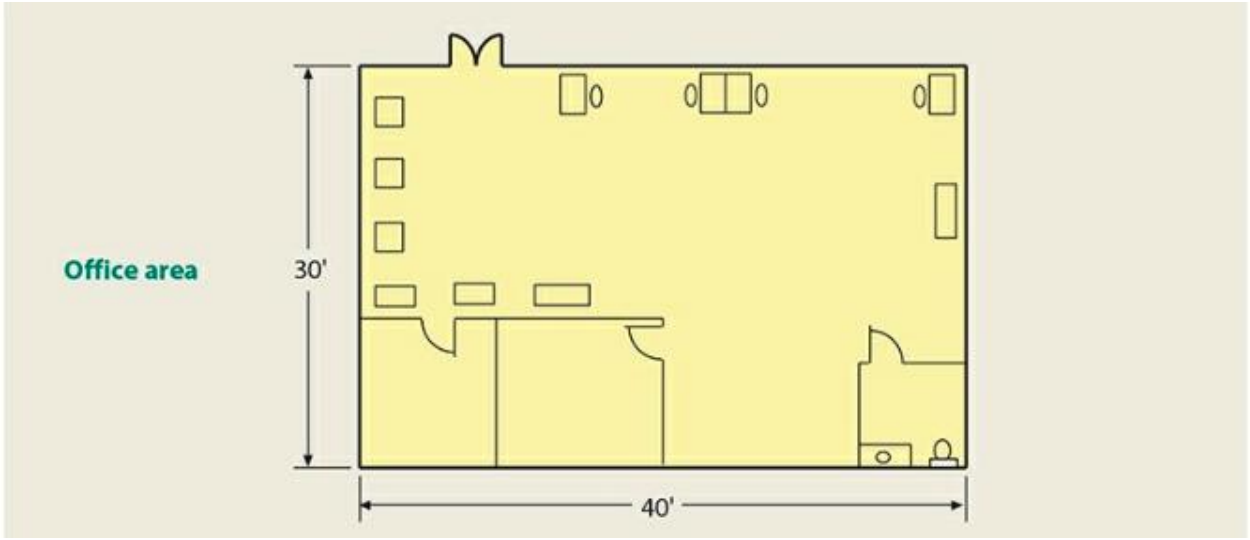
FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, 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	
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

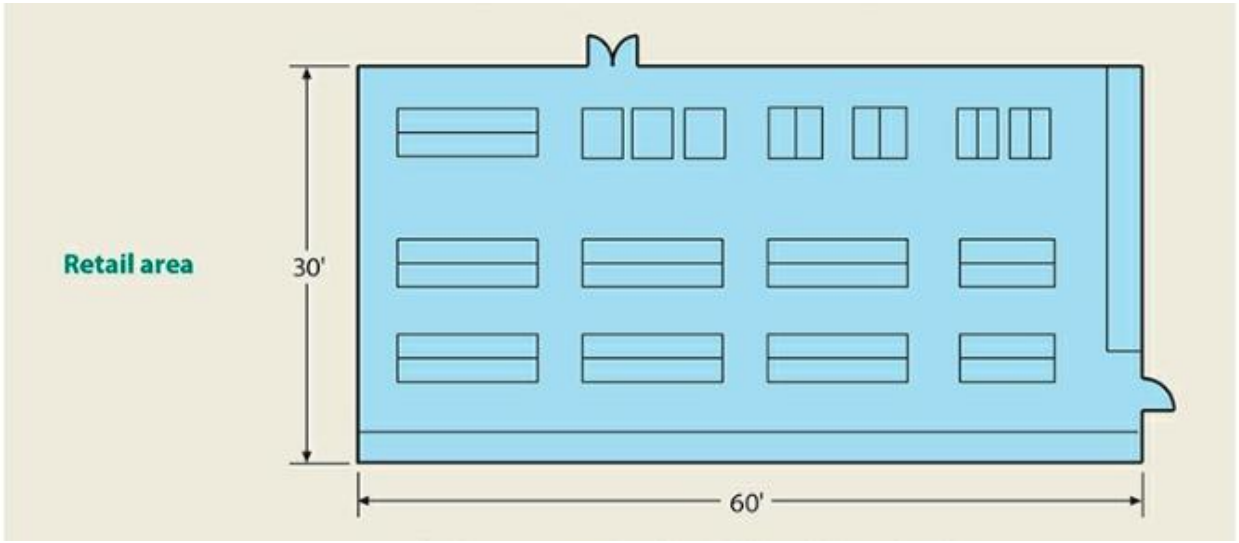
For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Source: 2021 IBC

1004.1, 1004.5 Design Occupant Load





Source: 2021 IBC

1004.1, 1004.5 Design Occupant Load

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	
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 m^2.

a. Floor area in square feet per occupant.

Source: 2021 IBC

1004.1, 1004.5 Design Occupant Load

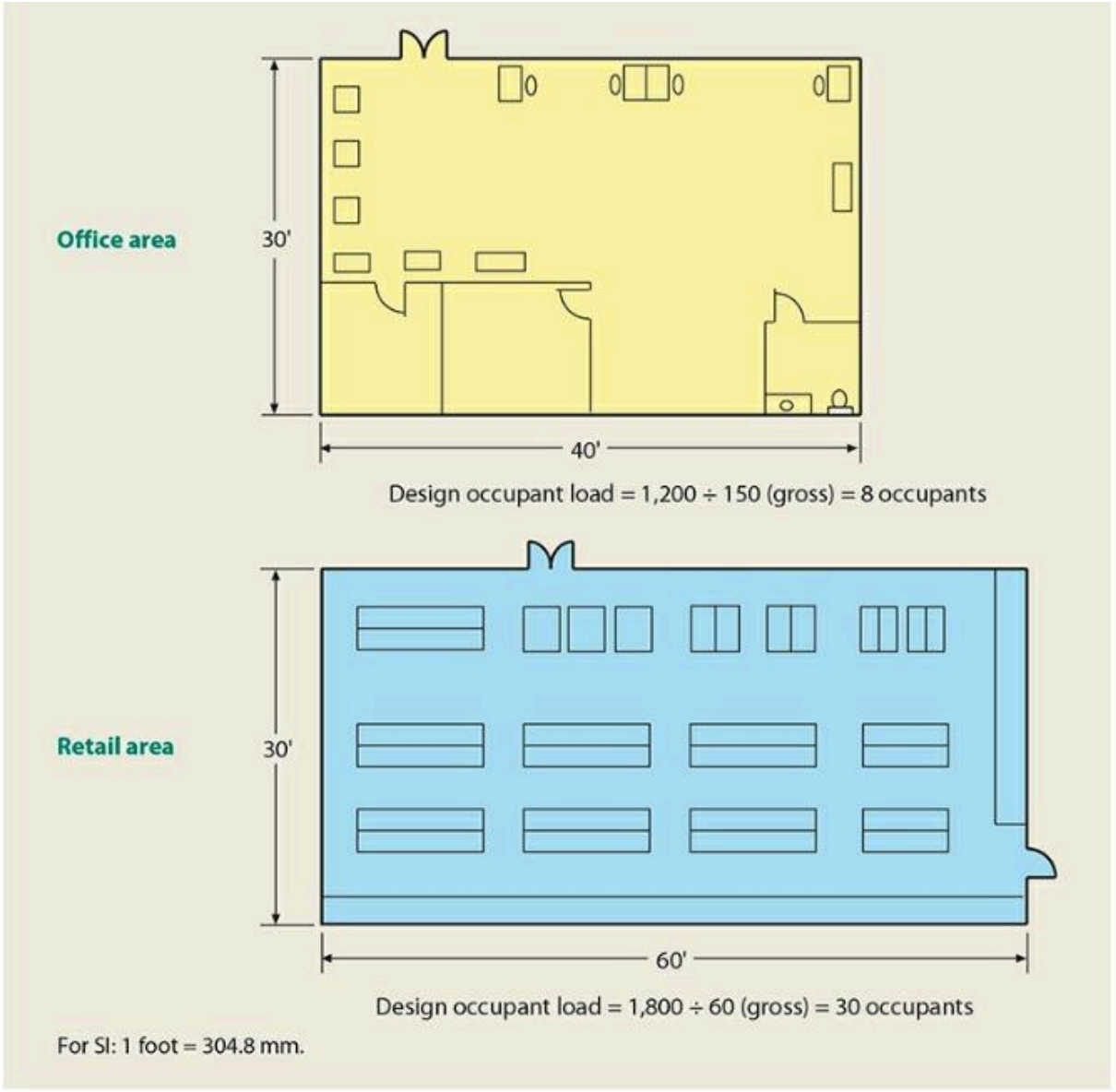
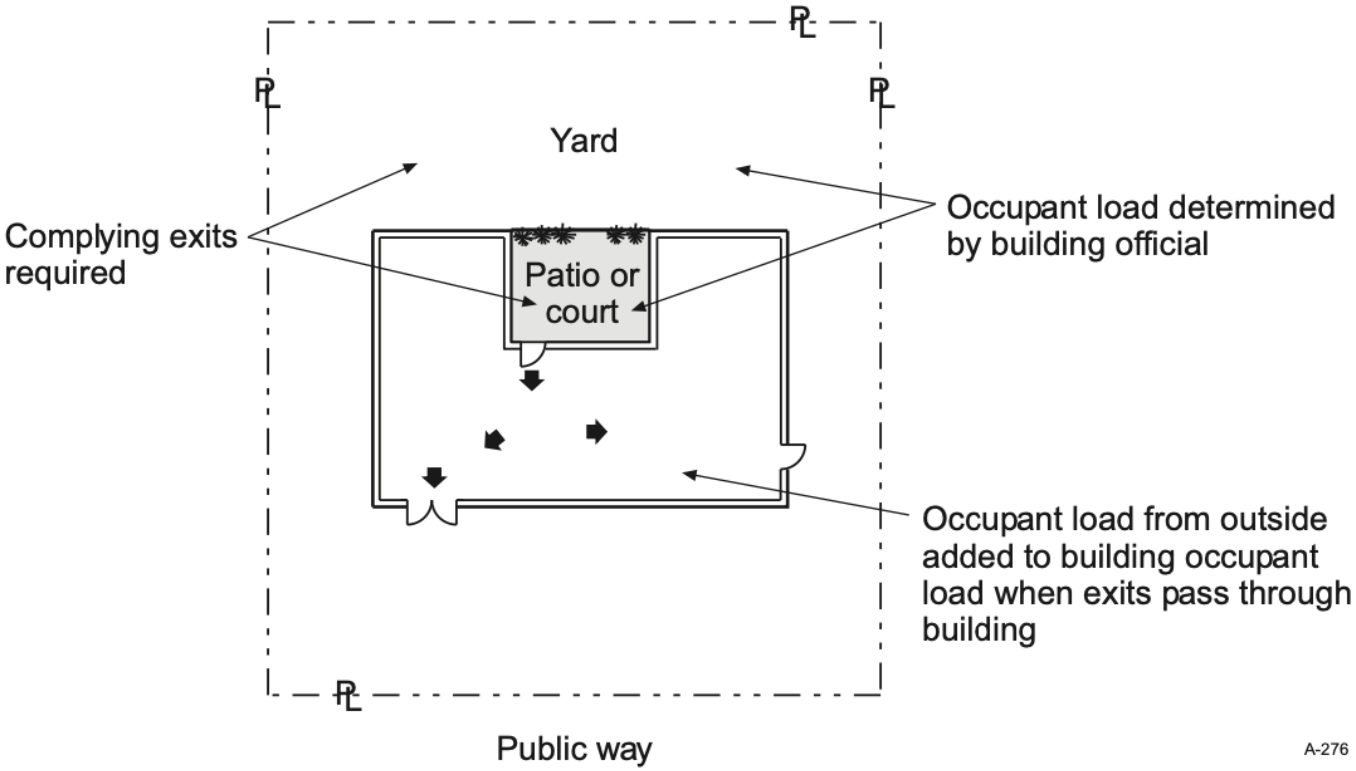


Figure 1004-5 **Design occupant load examples.**

Source: 2021 IBC

1004.7, Outdoor Areas



Where seating is provided without dividing arms, such as for benches and booths, it is reasonable to base the occupant load individually to each bench or booth. Similarly, it is appropriate to round the calculated occupant load down to the lower value, as this section only regulates each full **18 inches or 24 inches** of width.

Outdoor reviewing stands, grandstands and bleachers must have their occupant loads calculated according to the specific types of seating arrangements, such as chair backs, benches, loose chairs, etc. Additional specific requirements are contained in Section 1030.

Source: 2021 IBC

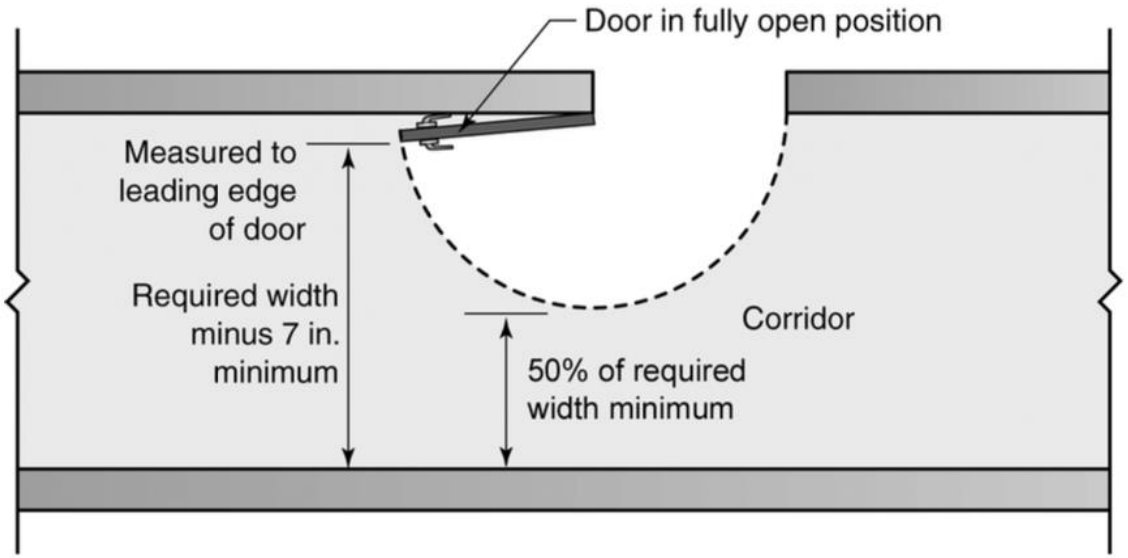
1005.2, 1005.3 Width and Capacity

- 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.

Source: 2021 IBC

1005.2, 1005.3 Width and Capacity

AC 011 - Egress: How to Calculate Egress Widths. - YouTube

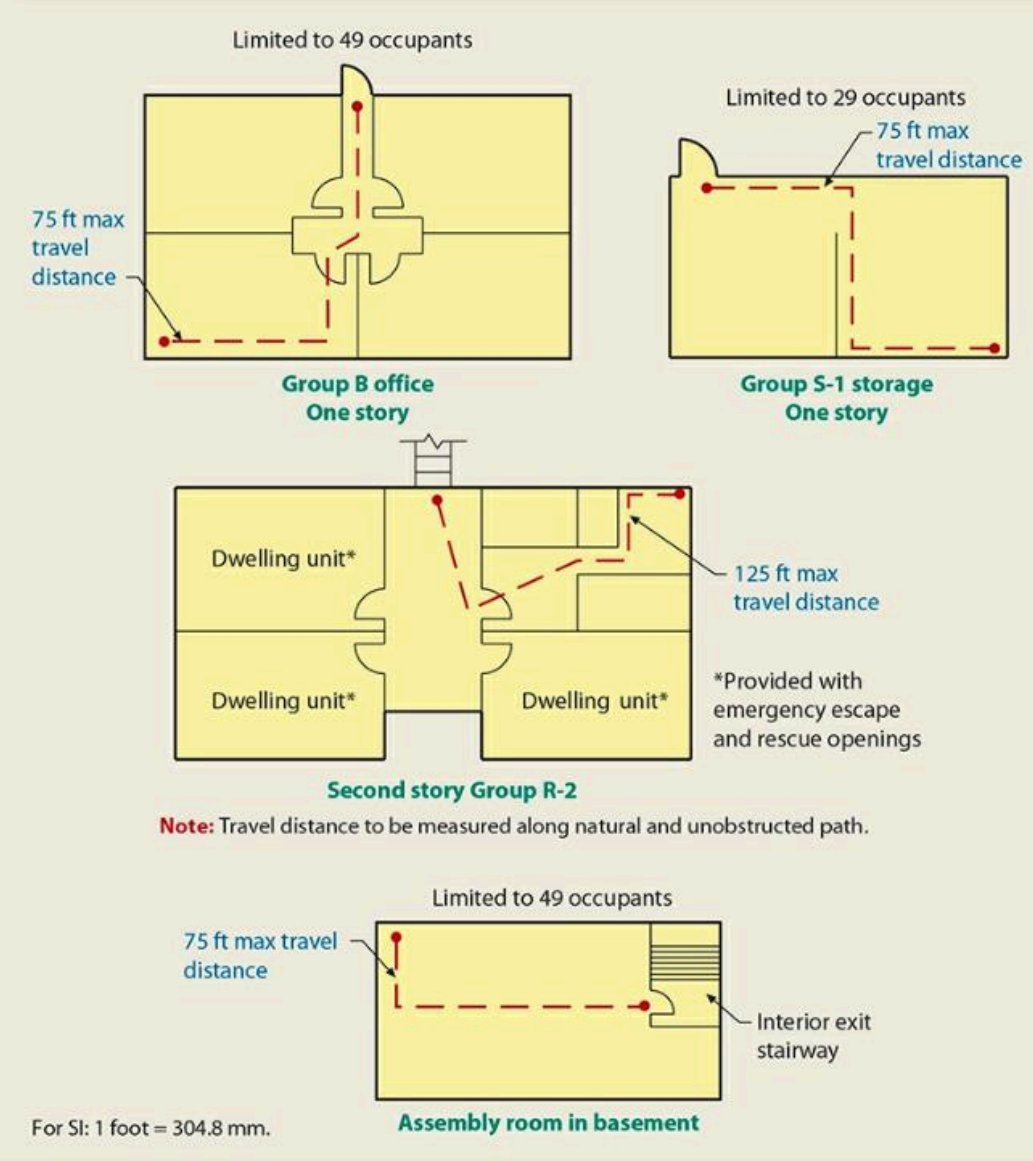


Measurement of minimum required egress width
Section 1005.7.1

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.

Source: 2021 IBC

1005.3.1, 1005.4, 1005.6, Exiting from Multiple Levels



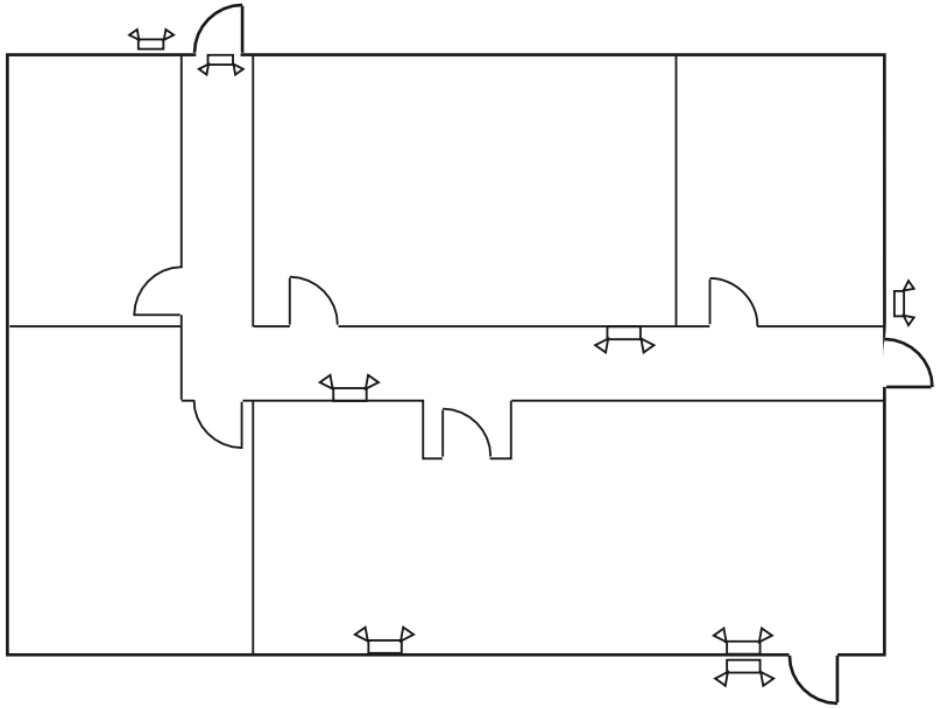
Source: 2021 IBC

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.

Source: 2021 IBC

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.

Source: 2021 IBC

1009.1, 1009.2 General

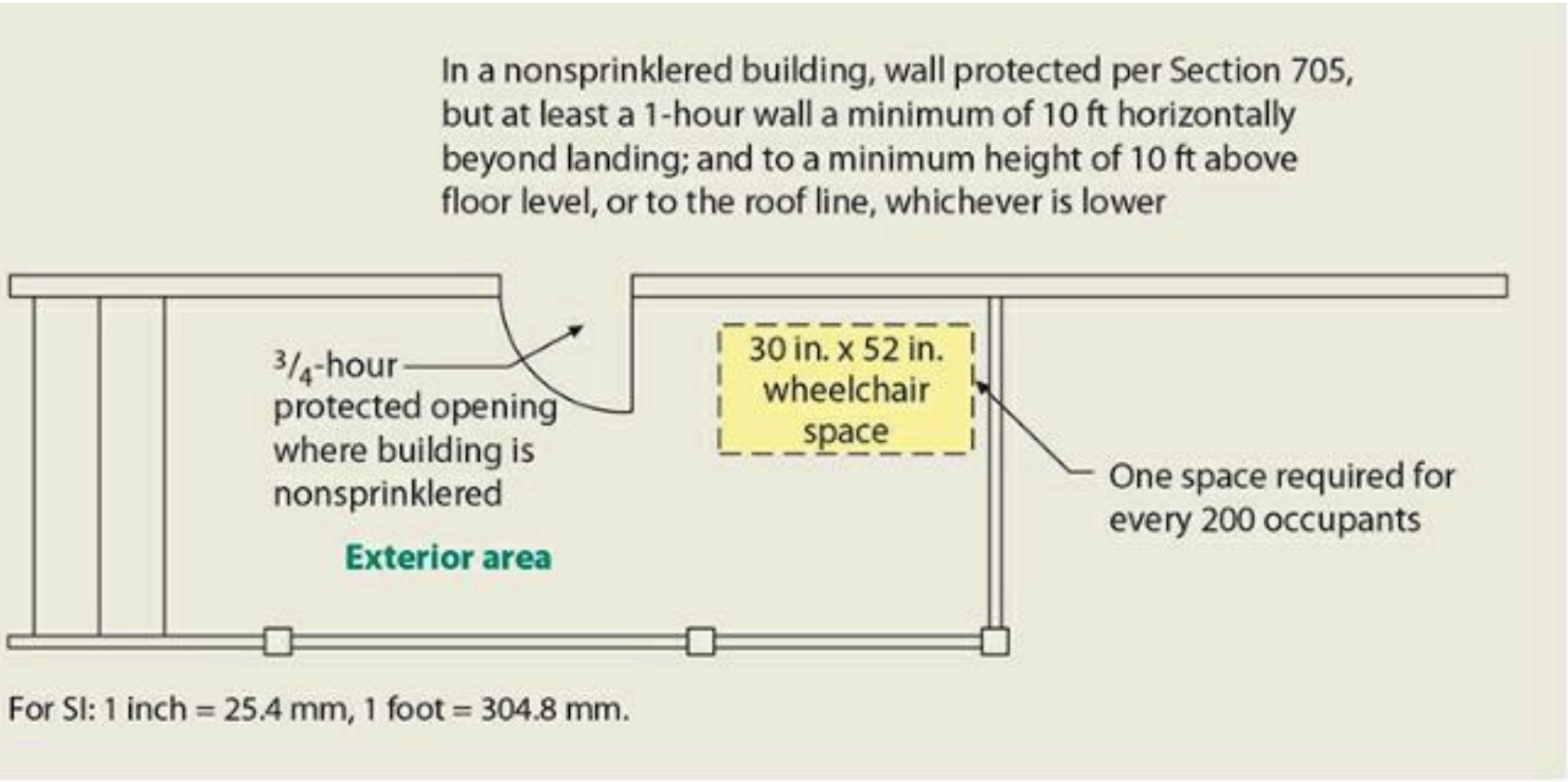
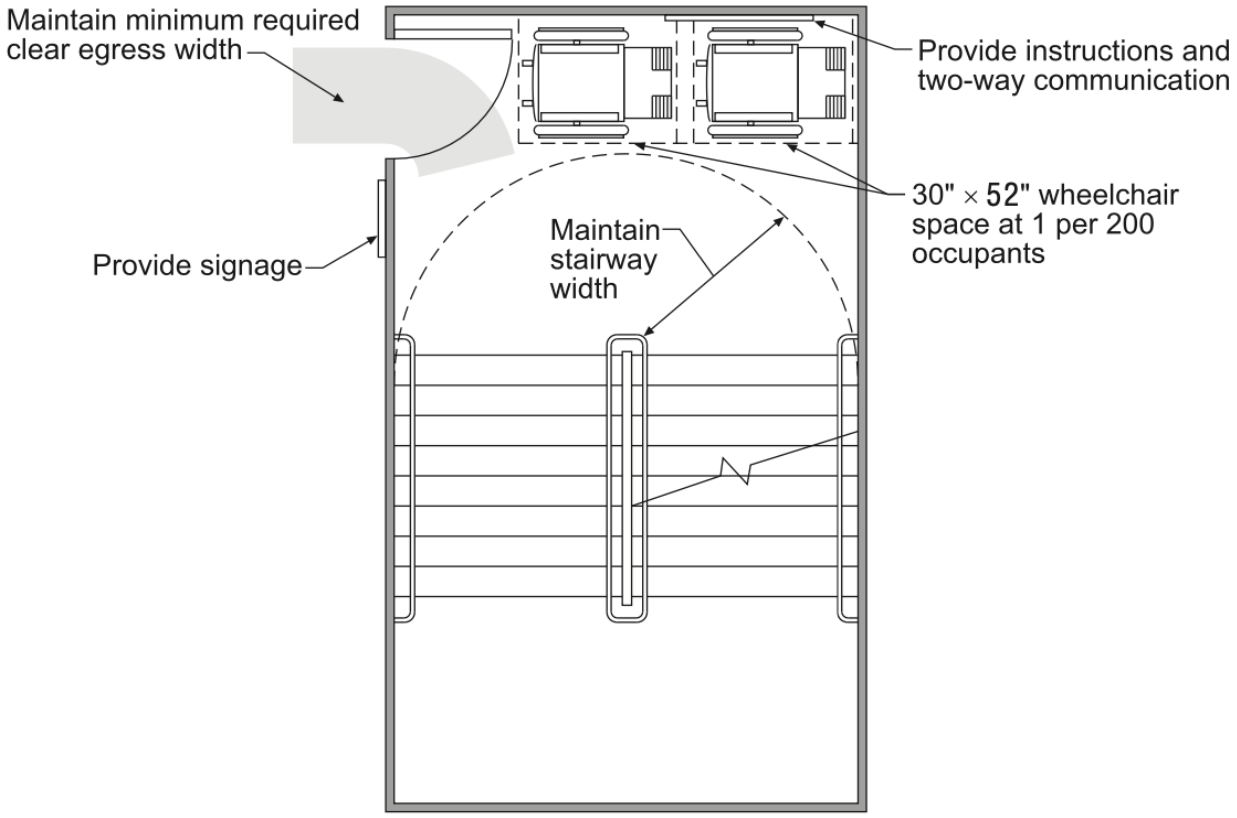


Figure 1009-2 Exterior area for assisted rescue.

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



For SI: 1 inch = 25.4 mm.

Required areas of refuge

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

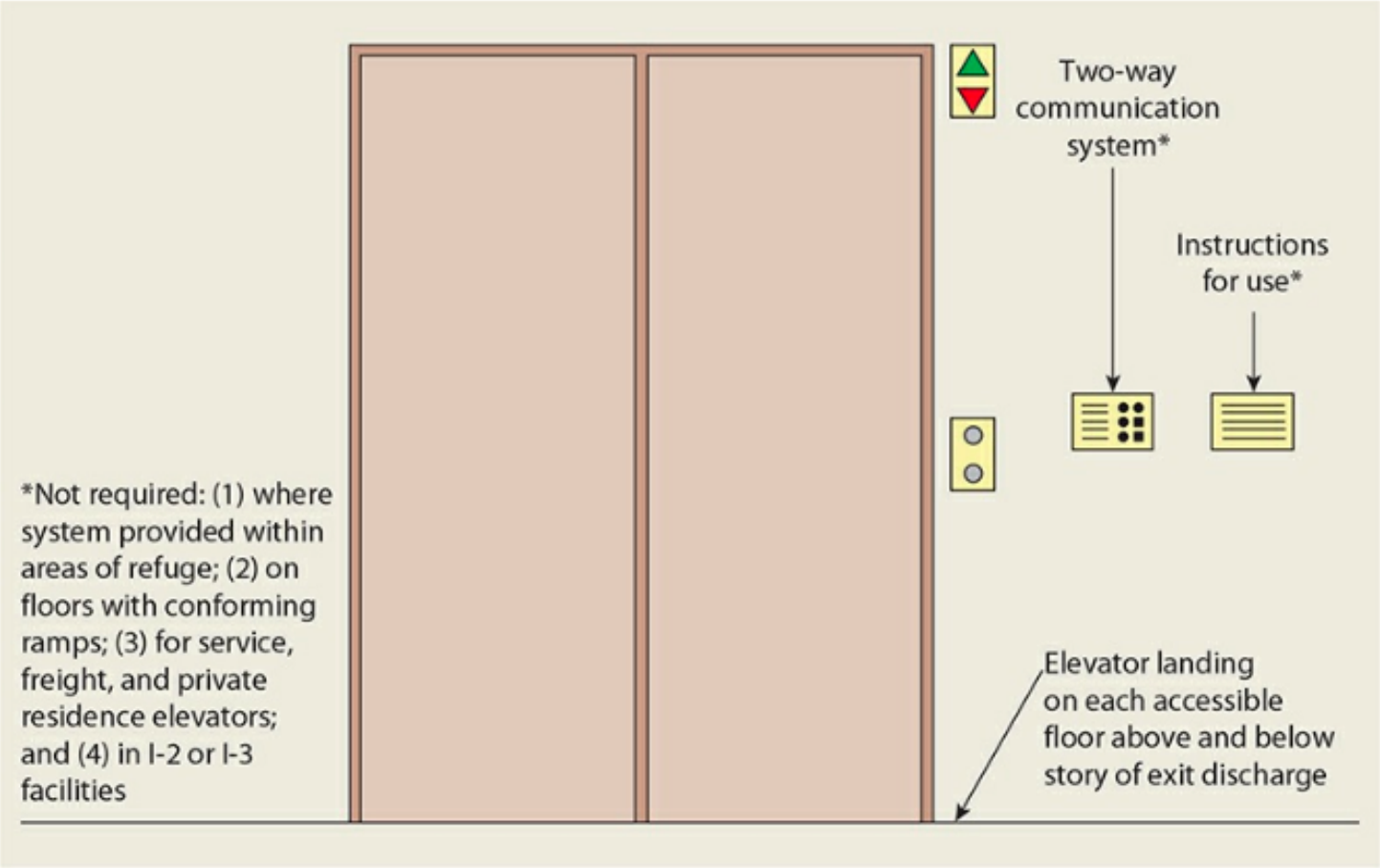


Figure 1009-3 Two-way communication system at elevator landing.

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.

Source: 2021 IBC

1010.6 Floor Elevations (Details in CH 11)

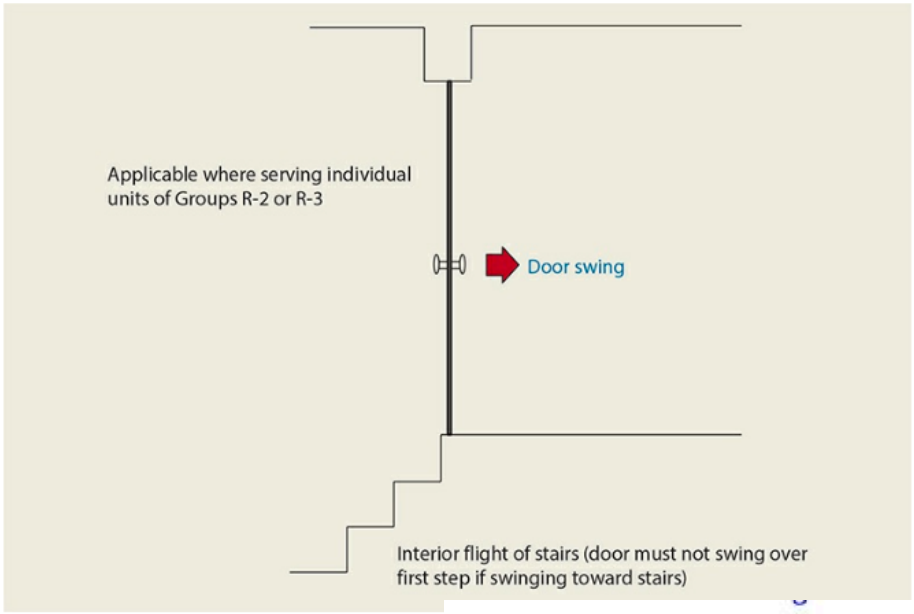


Figure 1010-6 **Floor level at doors.**

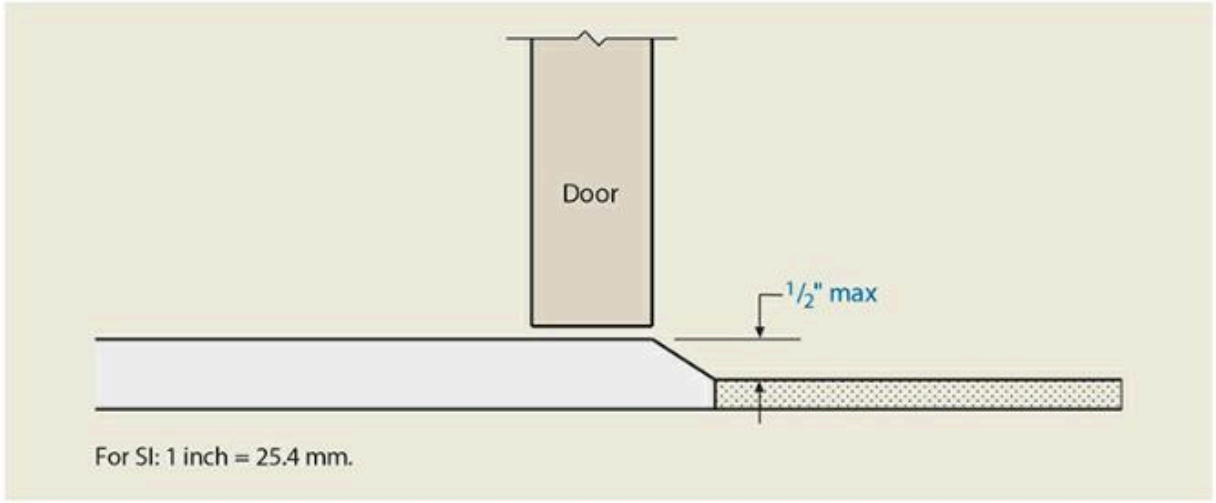
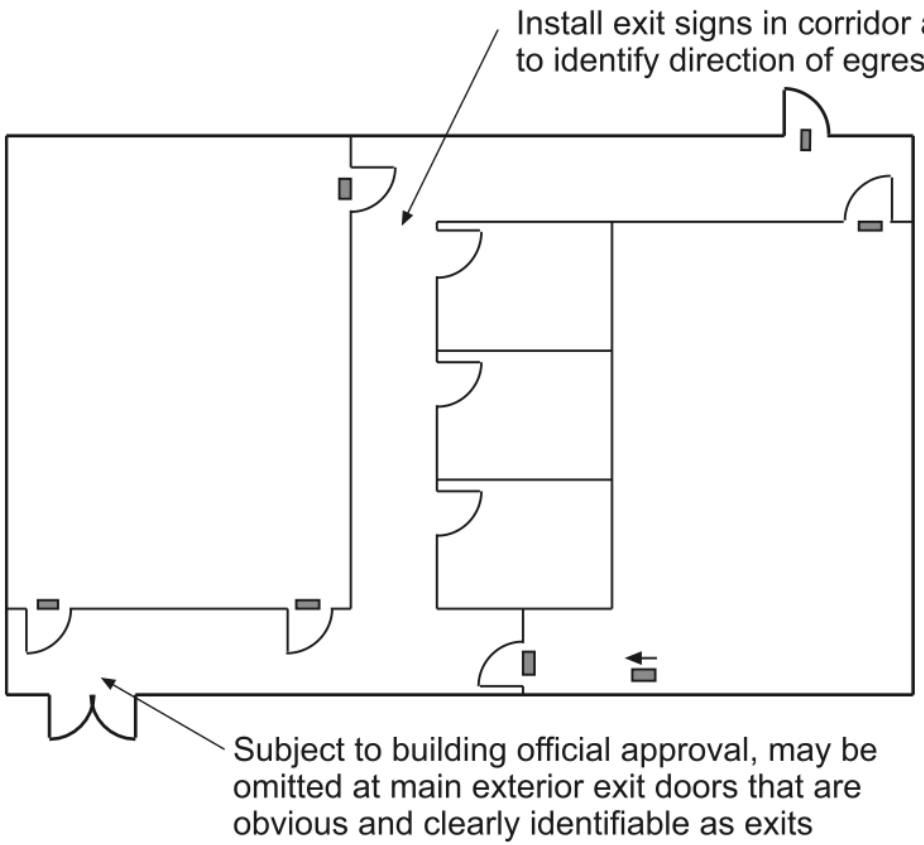


Figure 1010-5 **Floor elevation.**

Source: 2021 IBC

1013.1 Where Required: Exit Signs



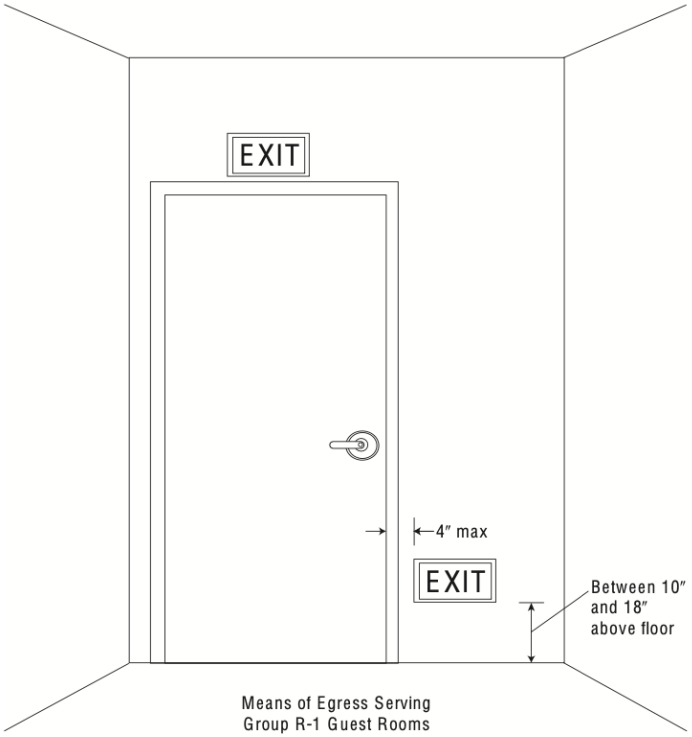
[A Brief History of the Exit Sign | ARTiculations - YouTube]

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.

Source: 2021 IBC

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.

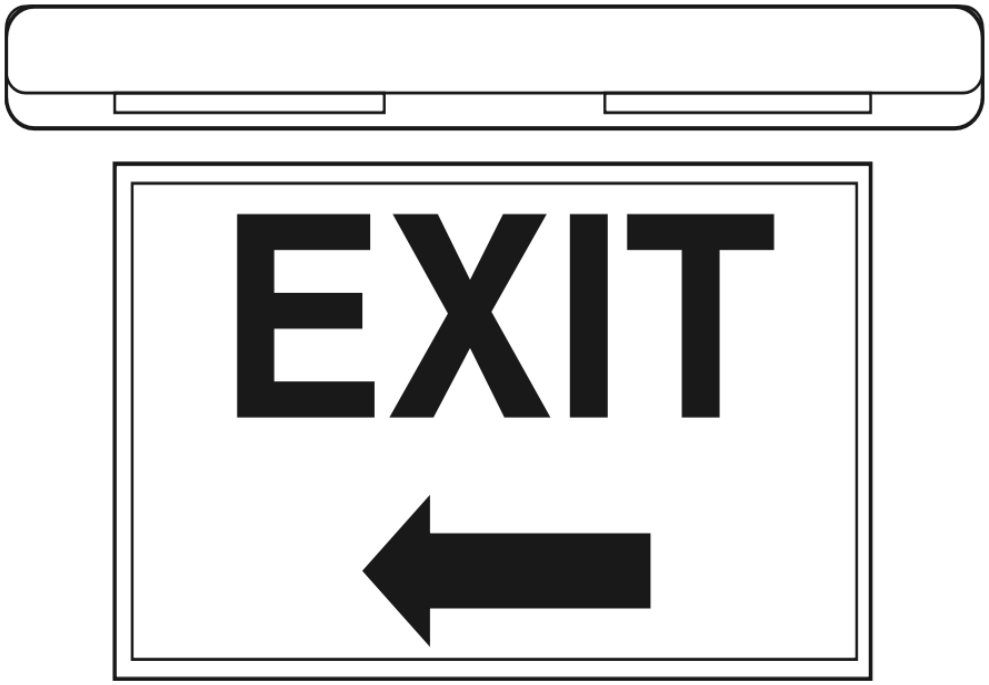
Source: 2021 IBC

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.

Source: 2021 IBC

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.

Source: 2021 IBC

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]

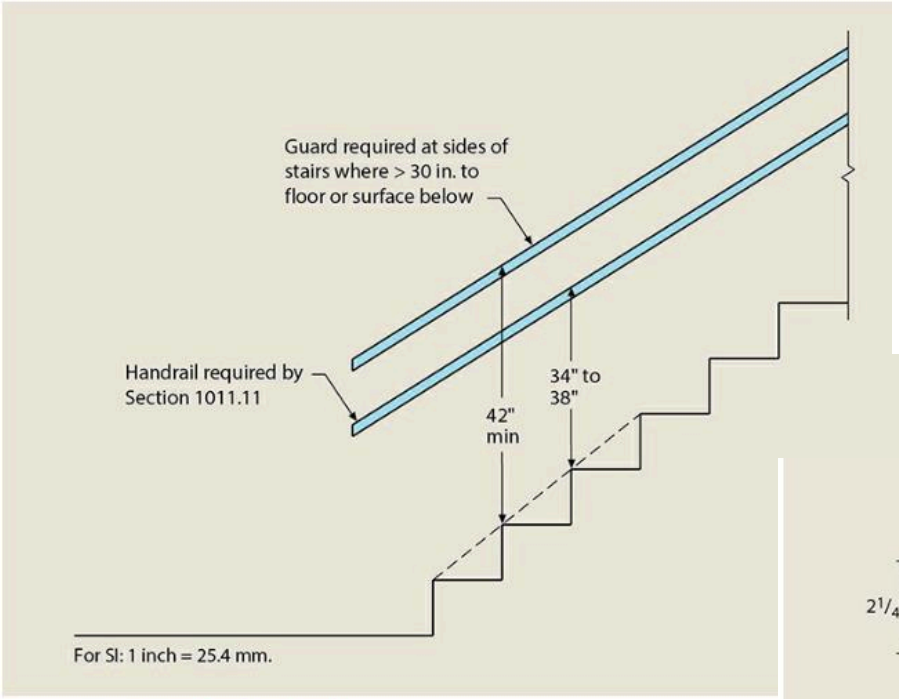


Figure 1014-1 **Guard and handrail.**

Figure 1014-6 **Ramp handrail extensions.**

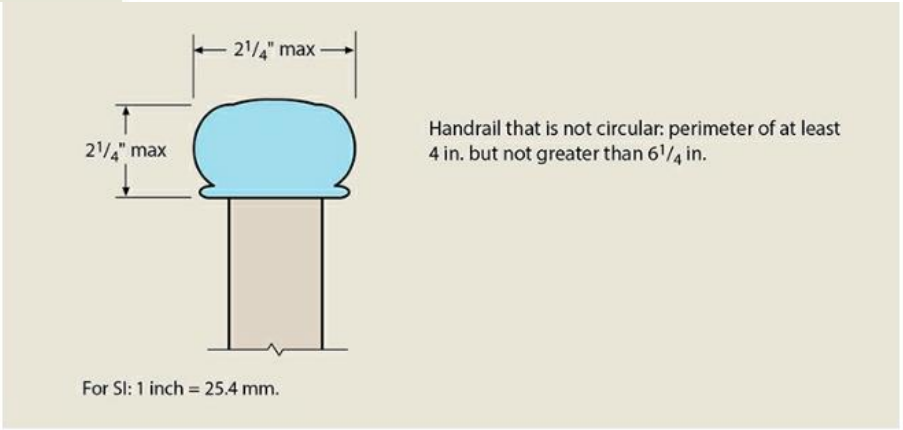
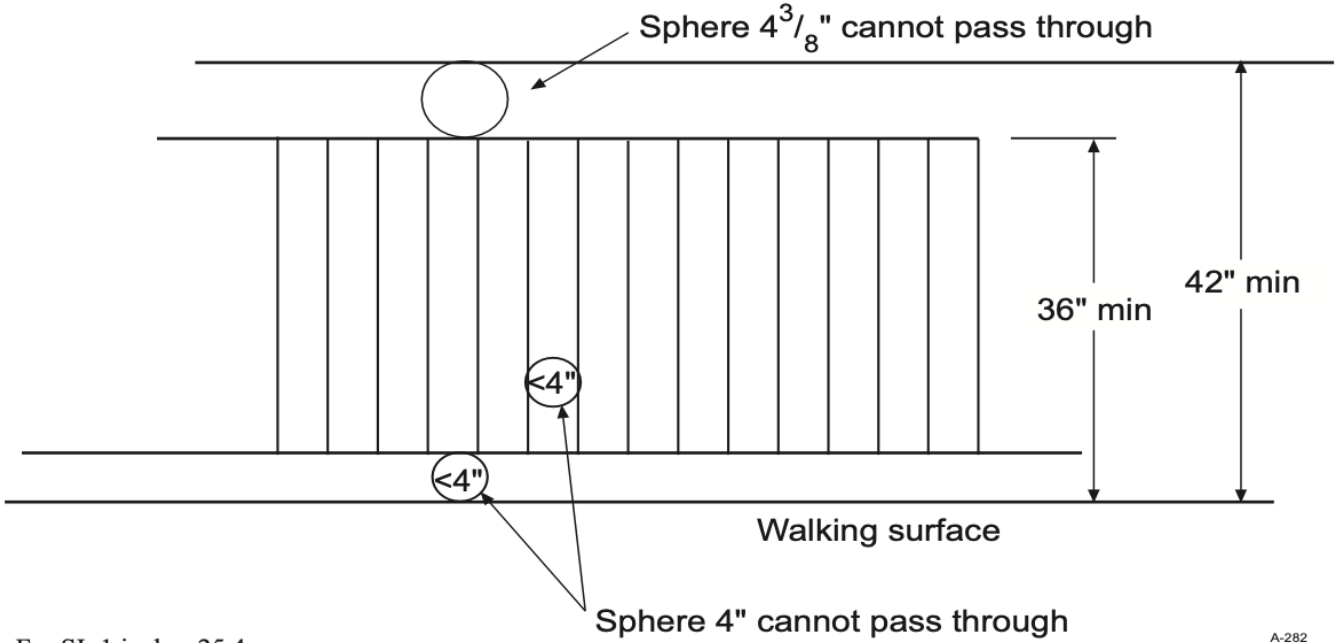


Figure 1014-2 **Noncircular handrail.**

Source: 2021 IBC

1015 Location, Height and Openings



For SI: 1 inch = 25.4 mm.

In certain industrial-type areas, the degree of guard protection is reduced because of the nonpublic uses involved. In addition, guards are not mandated in specific applications relating to loading docks, stages, platforms and vehicle service pits.

Source: 2021 IBC

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.

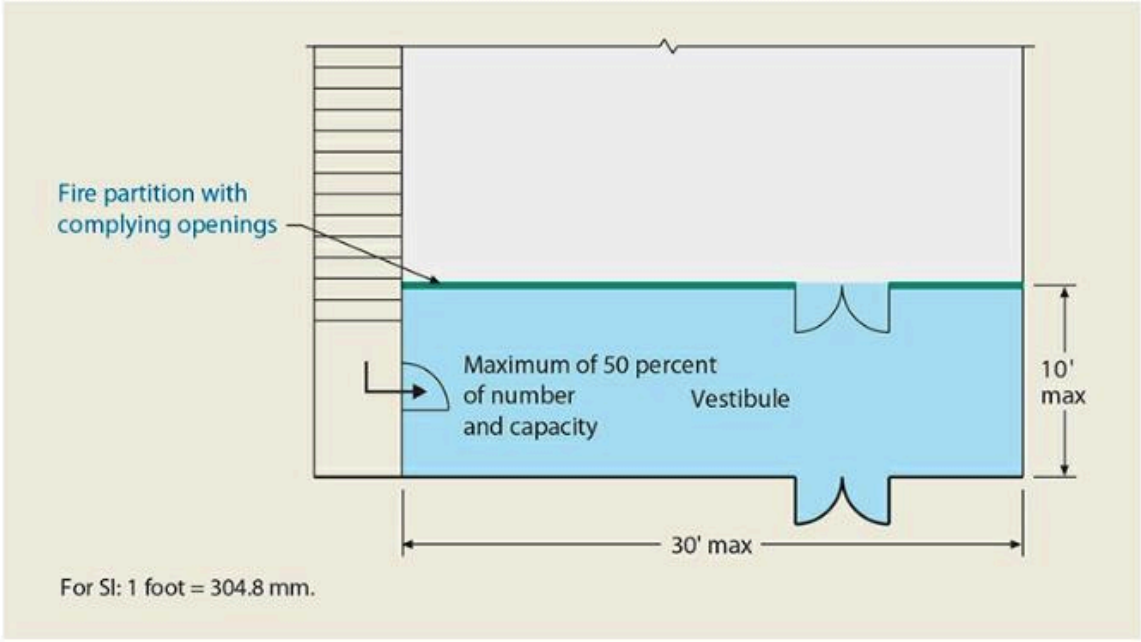


Figure 1028-2 **Exit discharge through vestibule.**

Source: 2021 IBC

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.

Source: 2021 IBC

Chapter Overview

Exit Access
Exit
Exit Discharge
Special Attention

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

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

Source: 2021 IBC

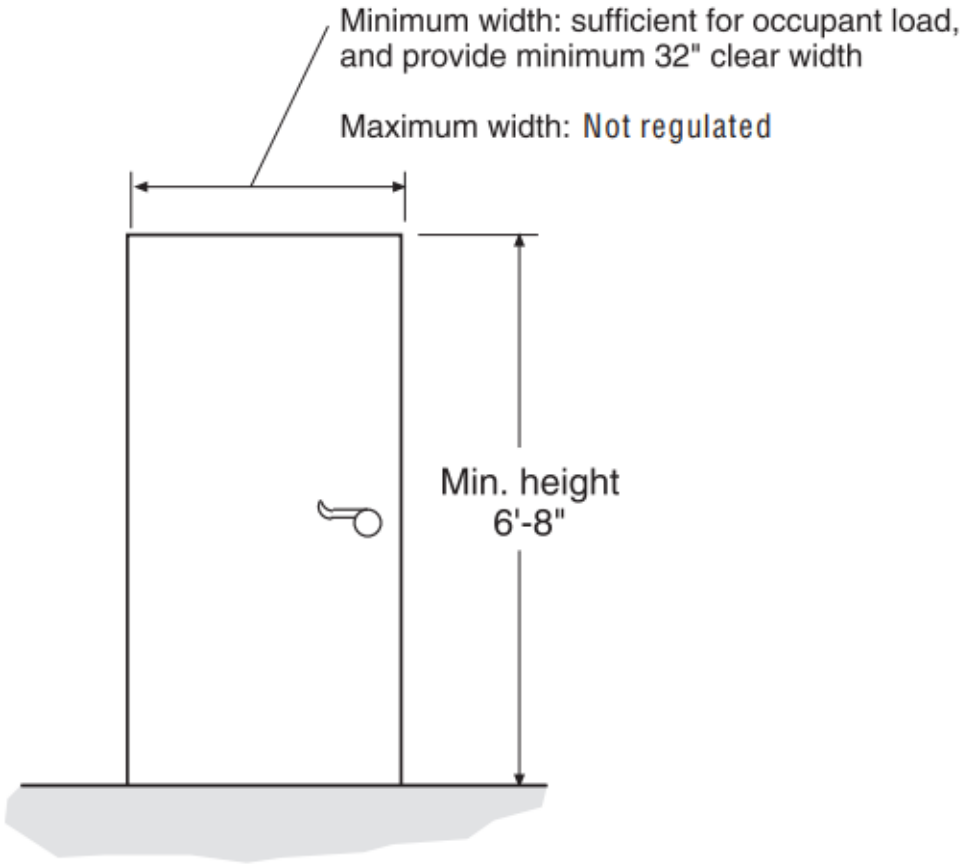
1010.1 Additional Doors and Identification

Exit Doors and Fire Doors - YouTube

- Doors, gates and turnstiles provided for egress purposes in numbers greater than required by the IBC shall comply with the requirements of Section 1010. Doors in the means of egress shall be readily distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Mirrors or similar reflecting materials shall not be used on means of egress doors. Means of egress doors shall not be concealed by curtains, drapes, decorations or similar materials.
- During a fire or other incident, occupants will attempt to exit through those doors that they believe will eventually lead to the exterior. Accordingly, any doors that would suggest an egress path must meet all of the door requirements. In addition, means of egress doors must be obvious and available for immediate use by the building occupants.

Source: 2021 IBC

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.

Source: 2021 IBC

1010.1 Additional Doors and Identification

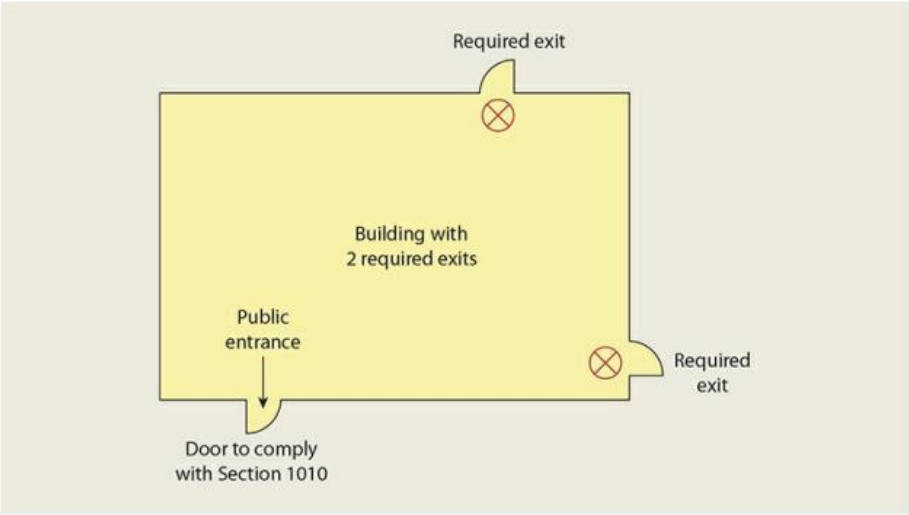


Figure 1010-1 **Additional door.**

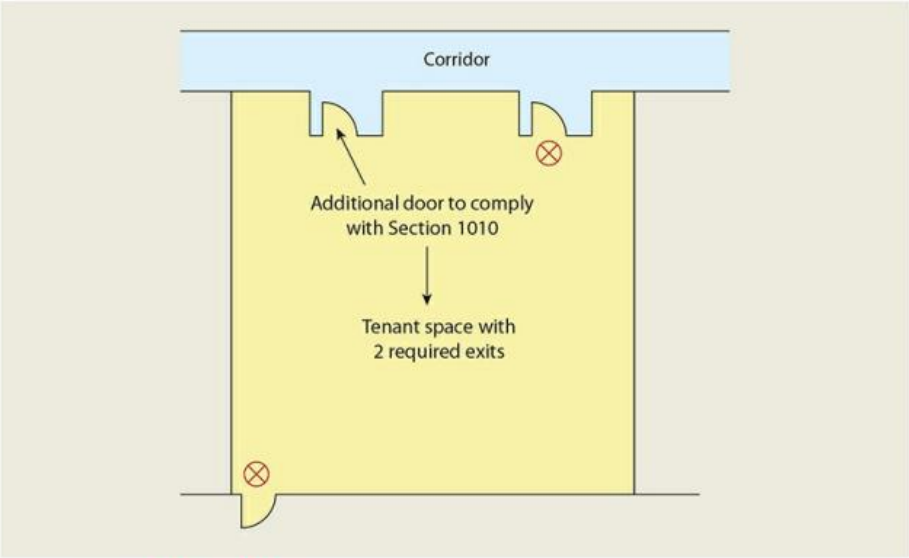


Figure 1010-2 **Additional door.**

Source: 2021 IBC

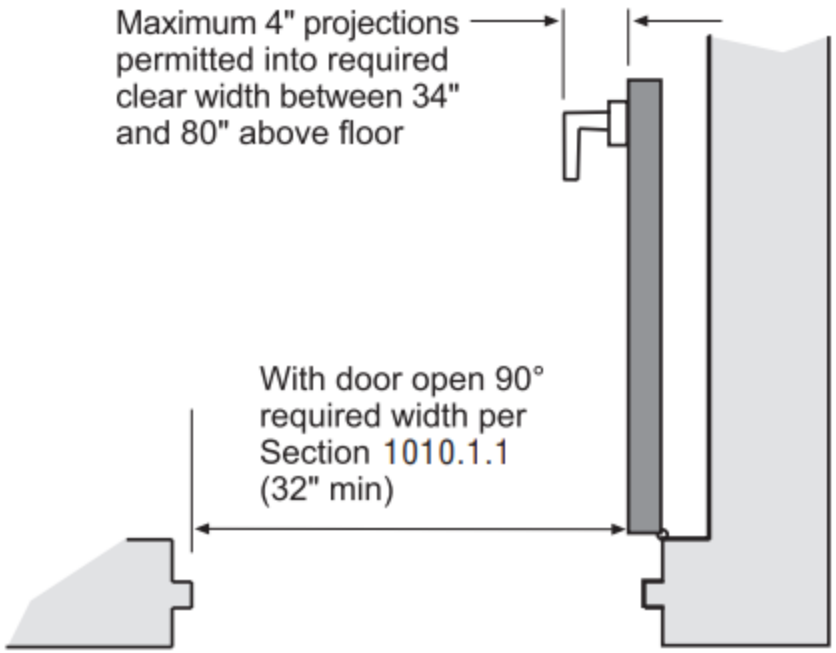
1010.1.1 Sizes of Doors

- 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.

Optional Decoded: Egress Requirements for Door Openings - YouTube

Source: 2021 IBC

1010.1.1 Sizes of Doors



Egress width at doors is net dimension

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.

Source: 2021 IBC

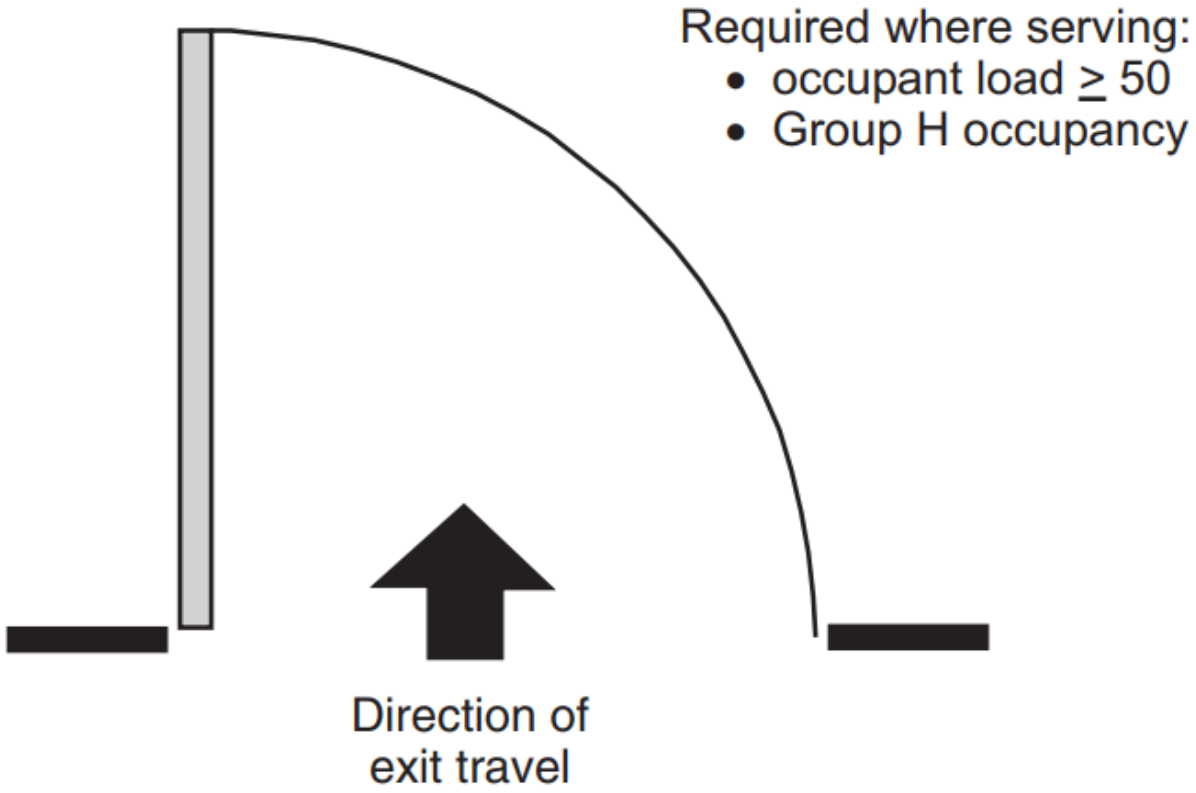
1010.1.2 Door Swing

- Egress doors shall be of the side-hinged swinging door, pivoted door, or balanced door types. See the multiple exceptions addressing special conditions. Side-hinged swinging doors, pivoted doors and balanced doors shall swing in the direction of egress travel where serving a room or area containing an occupant load of 50 or more persons or a Group H occupancy.
- Numerous fire deaths in buildings have been attributed to improper exit doors, but no single incident is more infamous than the 1942 Coconut Grove fire in Boston. Inward swinging exterior exit doors were a significant factor in the loss of 492 lives. As a result, doors serving sizable occupant loads or Group H occupancies must swing in the direction of exit flow. For assembly and educational occupancies, the use of panic hardware increases the likelihood that egress doors can be opened easily.

Source: 2021 IBC

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.

Source: 2021 IBC

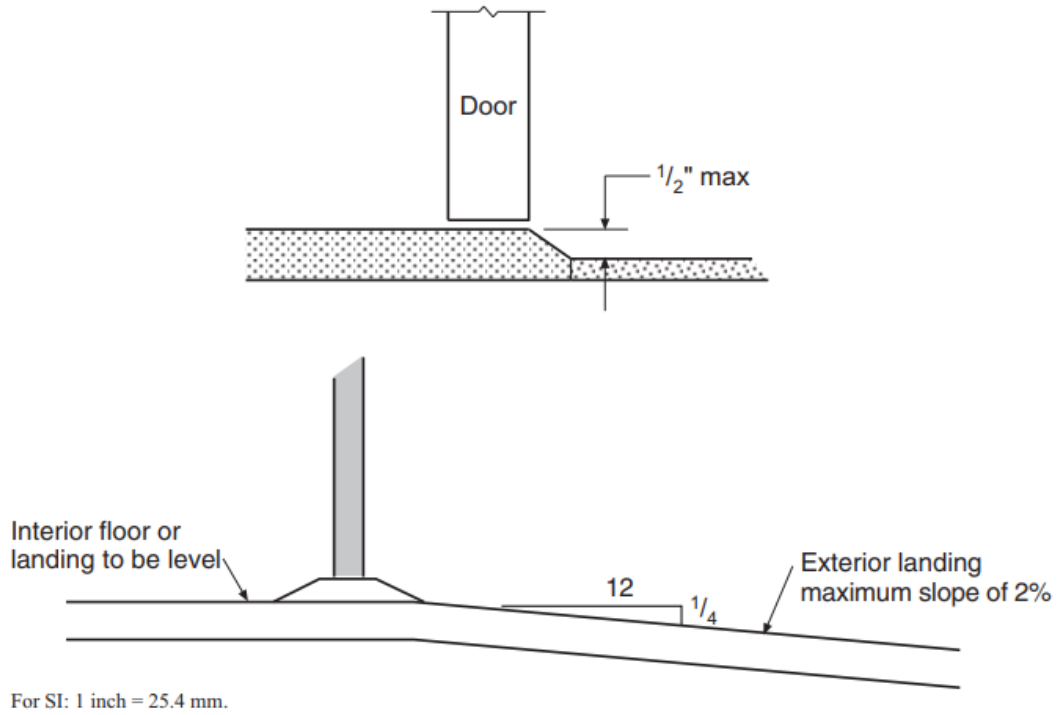
1010.1.4 Floor Elevation

- There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. See the exceptions.
- To avoid a surprise change in the elevation of a walking surface as it passes through a doorway, limitations have been placed on the height differential. The IBC generally requires that no elevation change occur at a door. In many cases, however, such a change in elevation takes place due to a variation in the type or thickness of floor finish materials. Where this occurs, a difference of no more than 1/2 inch is permitted. Otherwise, only those exceptions that apply to certain dwelling units or to exterior doors not on an accessible route may have an elevation change at a doorway.

Source: 2021 IBC

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 $^1/_4$ 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

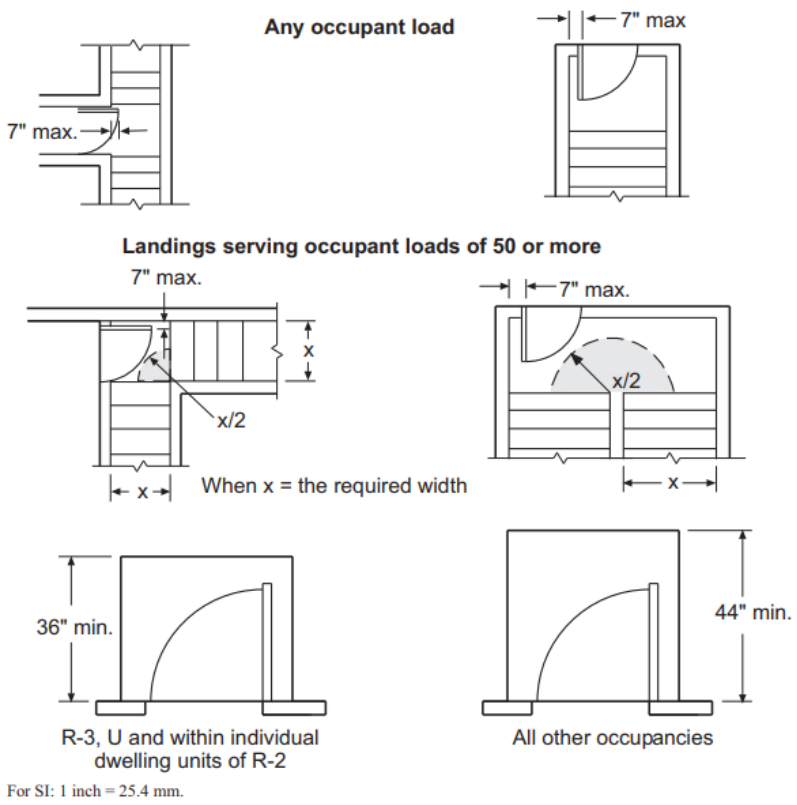
1010.1.5 Landings at Doors

- Landings shall have a width not less than the width of the stairway or the door, whichever is greater. Doors in the fully open position shall not reduce a required dimension by more than 7 inches (178 mm). When a landing serves an occupant load of 50 or more, doors in any position shall not reduce the landing to less than one-half its required width.
- This provision, which allows a door to project into the path of exit travel on a stairway's landing, comprises two issues. The first issue is that a door is not a fixed obstruction; it swings across the landing when it is used by occupants of the building. The second issue is that a door in any position is allowed to obstruct only one-half of the required width of the landing. The expectation is that the additional width of the landing will be provided for the occupants using the stairway as the door swings toward its fully open or fully closed position.

Source: 2021 IBC

1010.1.5 Landings at Doors

[Height of Landing or Stairway at Exterior Door – Building Codes for Stair Builders - YouTube]



In Group R-3 and U occupancies, and within individual units of Group R-2 occupancies, the length of a landing can be no less than 36 inches. In all other occupancy groups, the minimum required landing length is 44 inches, measured in the direction of travel.

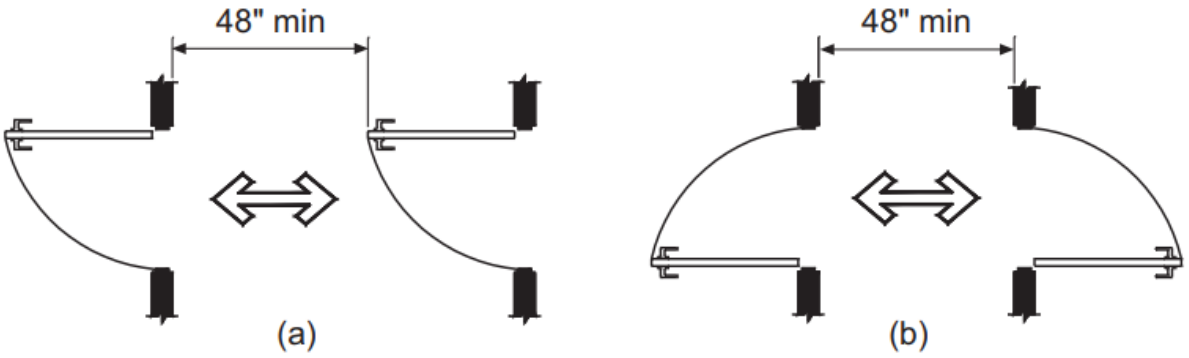
Source: 2021 IBC

1010.1.7 Door Arrangement

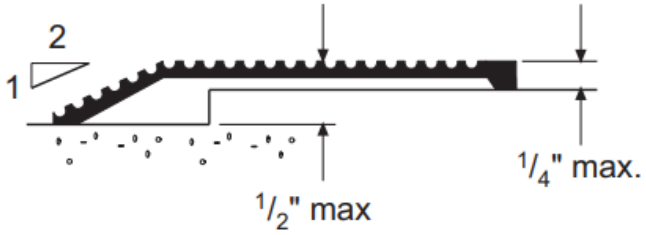
- Space between two doors in series shall be 48 inches (1219 mm) minimum plus the width of a door swinging into the space. Doors in series shall swing either in the same direction or away from the space between doors. See the exceptions for dwelling units and horizontal sliding power-operated doors.
- Where two doors are installed in a manner to create a vestibule or similar space, they must be located so as to allow building occupants effective and efficient movement through one door prior to continuing through the second door. This is especially true where the person opening the door has limited mobility and is required to make special effort in opening the door and passing through the doorway. The IBC recognizes these concerns by mandating an adequate spatial separation between doors provided in a series.

Source: 2021 IBC

1010.1.7 Door Arrangement



Two doors in series



Threshold height

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 $^1/_2$ inch. Otherwise, an abrupt change in elevation is limited to $^1/_4$ inch.

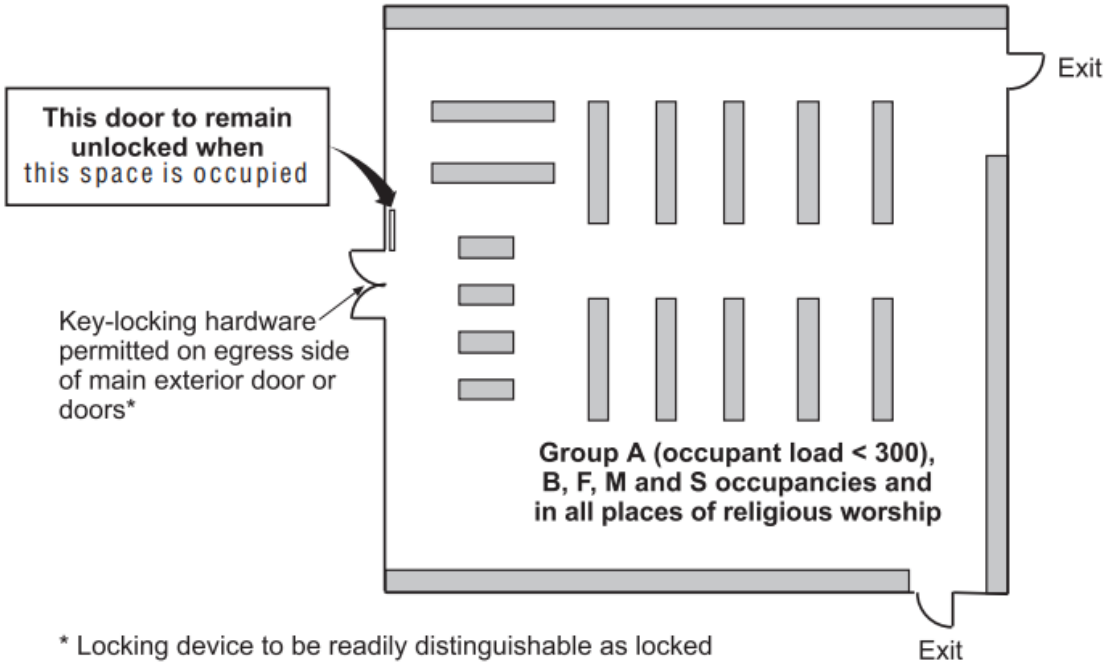
Source: 2021 IBC

1010.2 Operations

- Except as specifically permitted by Section 1010.2, egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort. Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor. Locks and latches shall be permitted to prevent operation of doors where any of 10 listed conditions exist. Manually operated flush bolts or surface bolts are not permitted. See the five exceptions. The unlatching of any door or leaf for egress shall not require more than one motion in a single linear or rotational direction to release all latching and all locking devices. See the exceptions identifying four locations that allow for multiple operations.
- Every element along the path of exit travel through a means of egress system, particularly doors, must be under the control of, and operable by, the person seeking egress. The intent is that the hardware installed be of a type familiar to most users, readily recognizable and usable under any emergency conditions.

Source: 2021 IBC

1010.2 Operations



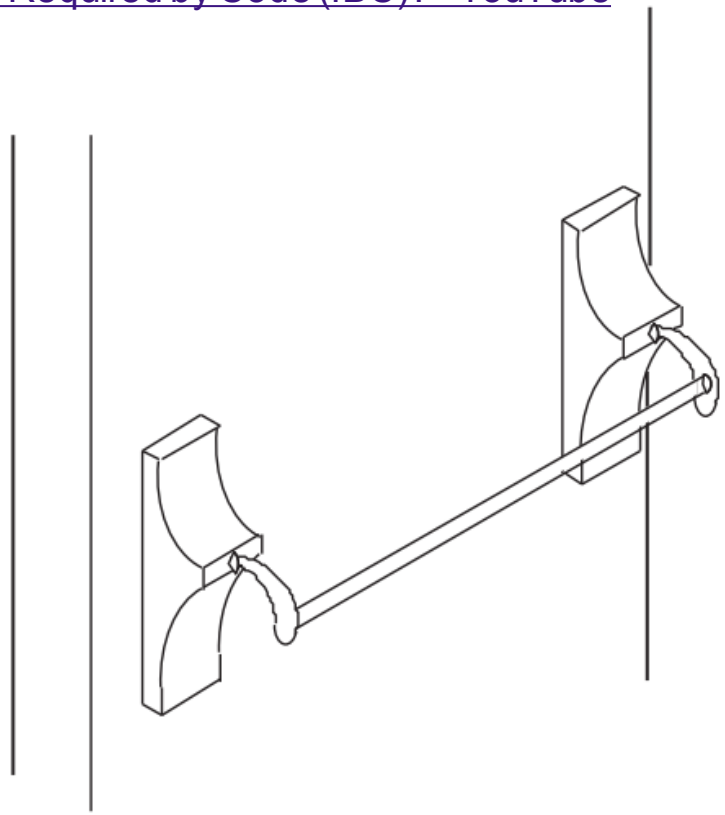
Section 1010.2.4, Exc. 3

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.

Source: 2021 IBC

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.

Source: 2021 IBC

1010.2.9 Panic and Fire Exit Hardware

- Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an occupant load of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than panic hardware or fire exit hardware. See the exceptions for the main exit of a Group A occupancy, electrically locked doors serving Group A or E occupancies, exit access doors serving occupied exterior areas, and doors in courtrooms.
- Panic hardware is a door-latching assembly incorporating a device that releases the latch when force is applied in the direction of exit travel. It is utilized in assembly occupancies because of the hazard that occurs when a large number of occupants reach an exit door at the same instance. In educational occupancies, the same concern is present, along with the need for children to be able to operate the latch of an exit door easily during an emergency. Panic hardware is mandated in all Group H occupancies, regardless of occupant load, on account of the increased hazard level anticipated within the building. Fire exit hardware is merely panic hardware listed for use on a fire door assembly.

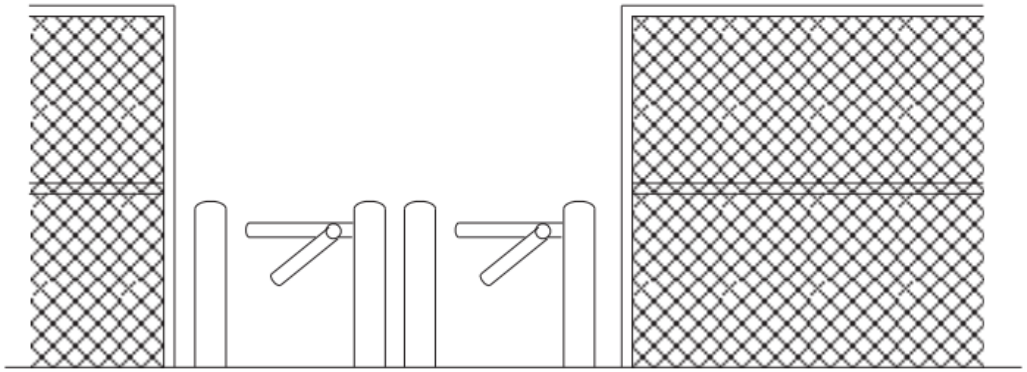
Source: 2021 IBC

1010.5 Turnstiles

- Turnstiles or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required means of egress, except where permitted in accordance with Sections 1010.5.1, 1010.5.2 and 1010.5.3.
- Turnstiles may serve as an egress component under very specific conditions. Where the listed conditions are met, each turnstile can be assigned a maximum exit capacity of 50 persons. Where permanent turnstiles serve an occupant load greater than 300, additional side-hinged swinging doors must be installed within 50 feet of the permanent turnstiles.

Source: 2021 IBC

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 $16^{1}/_{2}$ inches clear width at and below height of 39 inches
- Has minimum of 22 inches clear width at height above 39 inches

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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.

Source: 2021 IBC

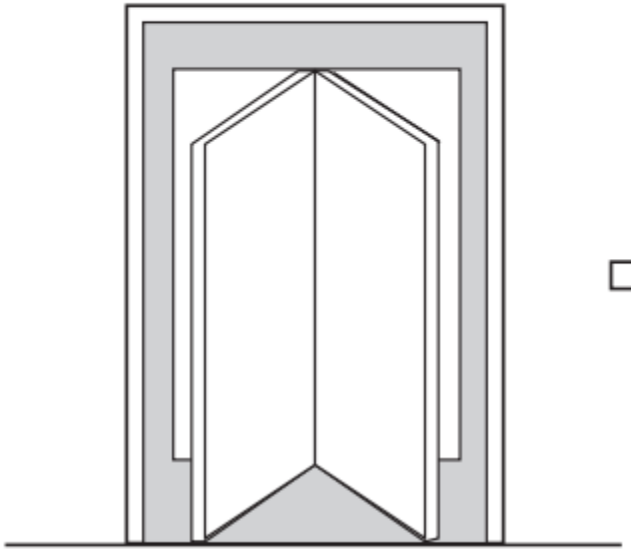
1010.3 Special Doors

- Special doors and security grilles shall comply with the requirements of Sections 1010.3.1 through 1010.3.4.
- In general, doors in means of egress systems must be of the pivoted or side-hinged swinging type. Other doors, identified as special doors, are also addressed in the code. Such doors include revolving doors, power-operated doors, horizontal sliding doors and security grilles. These types of doors are specifically limited in their use because the difficult or unusual operation of such doors increases the likelihood of obstructed travel in an emergency.

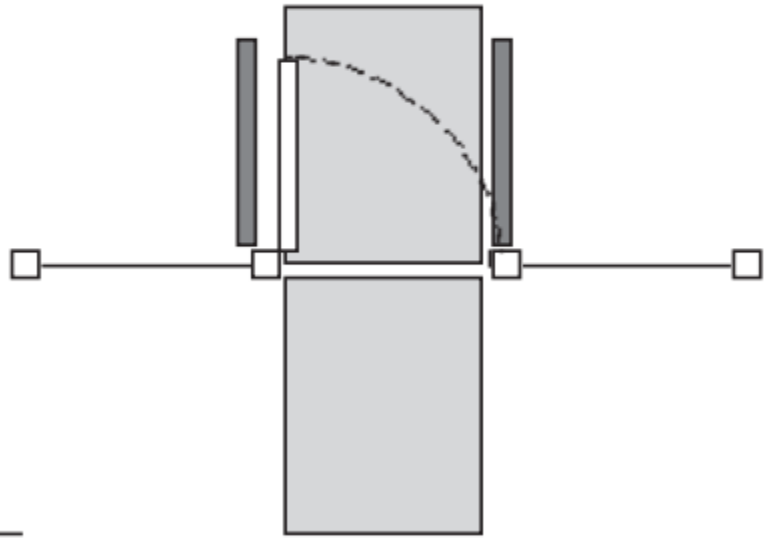
Source: 2021 IBC

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.

Source: 2021 IBC

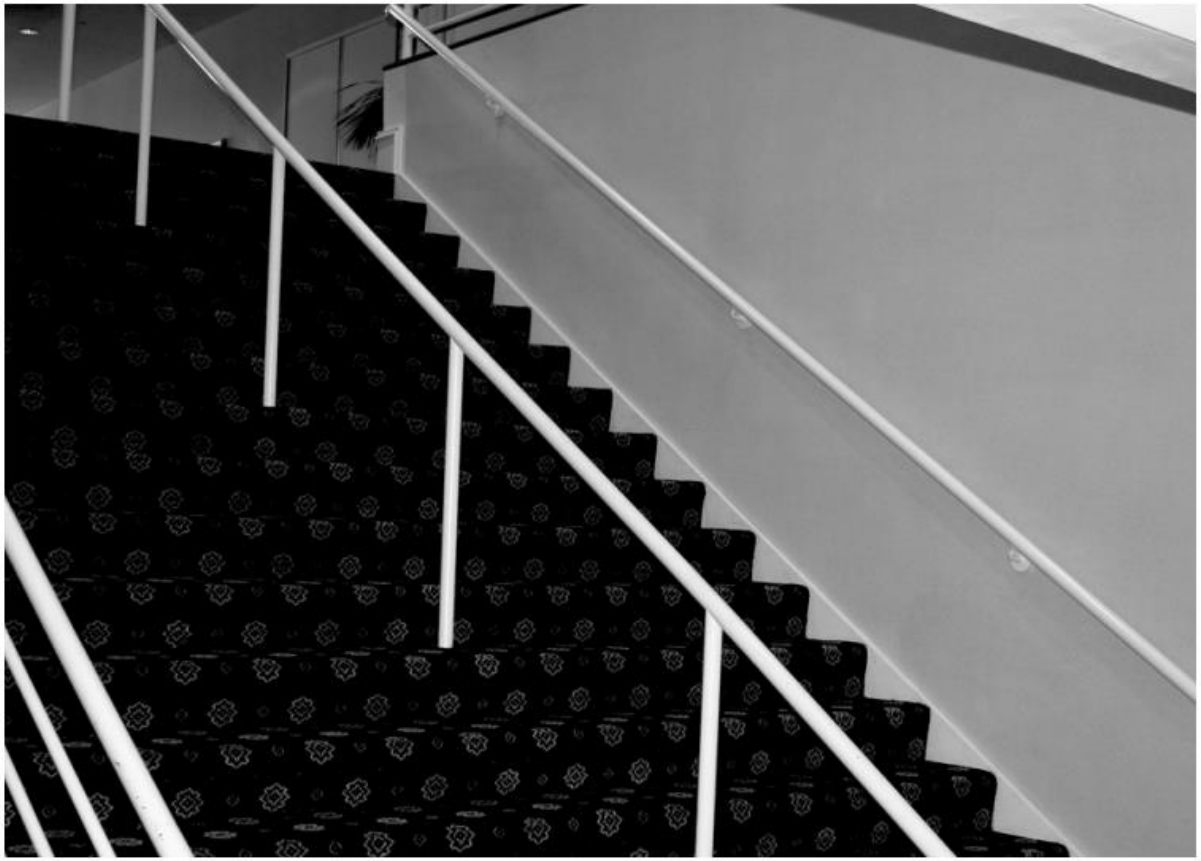
1011.1 General Provision Stairways

Stairway Inspection for Life Safety - YouTube

- Stairways serving occupied portions of a building shall comply with the requirements of Sections 1011.2 through 1011.13. Alternating tread devices shall comply with Section 1011.14. Ships ladders shall comply with Section 1011.15. Ladders shall comply with Section 1011.16. See the exception requiring stepped aisles in assembly spaces to comply with Section 1030.
- In addition to the general design and construction requirements established in Section 1011, provisions regulating stairways used as a required part of the means of egress are also found in Chapter 10. Interior exit stairways, regulated by Section 1023, are considered exits and must always be enclosed with fire-resistance-rated construction. Exit access stairways, regulated in Section 1019, are considered portions of the exit access and are permitted to be unenclosed under a variety of special conditions.

Source: 2021 IBC

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.

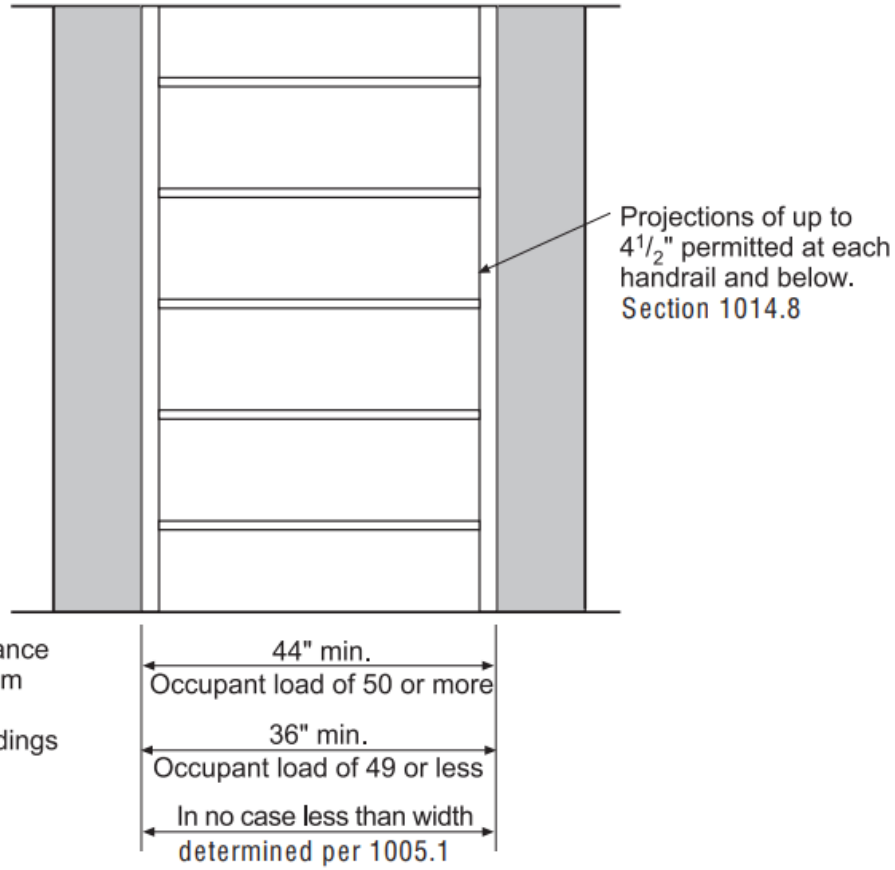
Source: 2021 IBC

1011.2, 1014.8 Stairways Width

- The required capacity of stairways shall be determined as specified in Section 1005.1 (calculated based on occupant load) but the minimum width shall not be less than 44 inches (1118 mm). See the exceptions for small occupant loads, spiral stairways and where a stairway lift is installed. Projections into the required width at each side shall not exceed 41/2 inches (114 mm) at or below the handrail height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1011.3.
- A stairway is considered one or more flights of stairs, each made up of one or more risers and any connecting landings. Any change of elevation along a travel path, unless accomplished by a ramp, must include a stair or stairway. Although stairways are generally required to be at least 44 inches in width, a 36-inch-wide stairway is permitted where serving an occupant load of 49 or less.

Source: 2021 IBC

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.

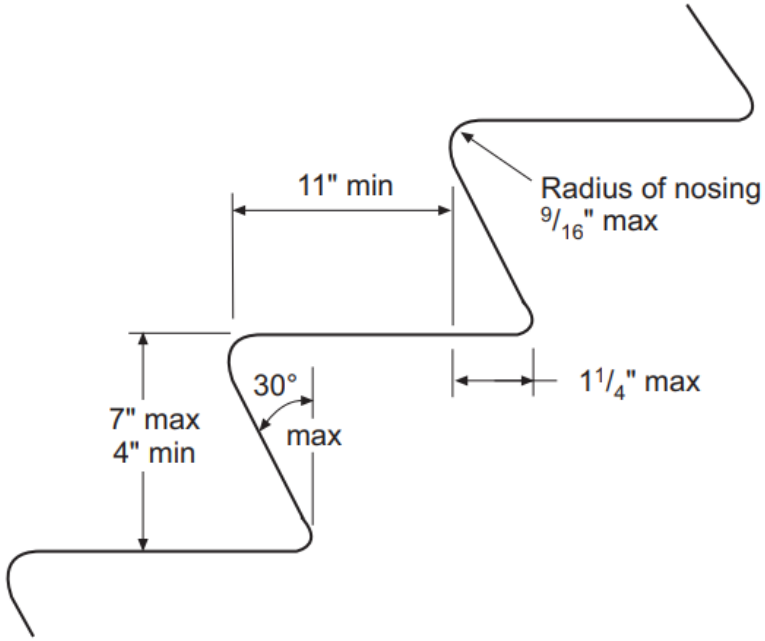
Source: 2021 IBC

1011.5 Stair Treads and Risers

- Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. Rectangular tread depths shall be 11 inches (279 mm) minimum. See the exceptions, including the allowance for greater riser heights (73/4 inches) and shallower tread depths (10 inches) in Group R-3 and associated Group U occupancies, and within individual dwelling units of Group R-2.
- The stairway 7-11 rule is the result of much research and discussion on stairway design. In addition to the proportional criteria that has been developed, the uniformity of the treads and risers in a flight of stairs is critical. The maximum variation between the highest and lowest risers and between the shallowest and deepest treads is limited to 3/8 inch within any flight, which is intended as a permissible construction tolerance.

Source: 2021 IBC

1011.5 Stair Treads and Risers



Treads and risers to be of uniform size and shape
(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.

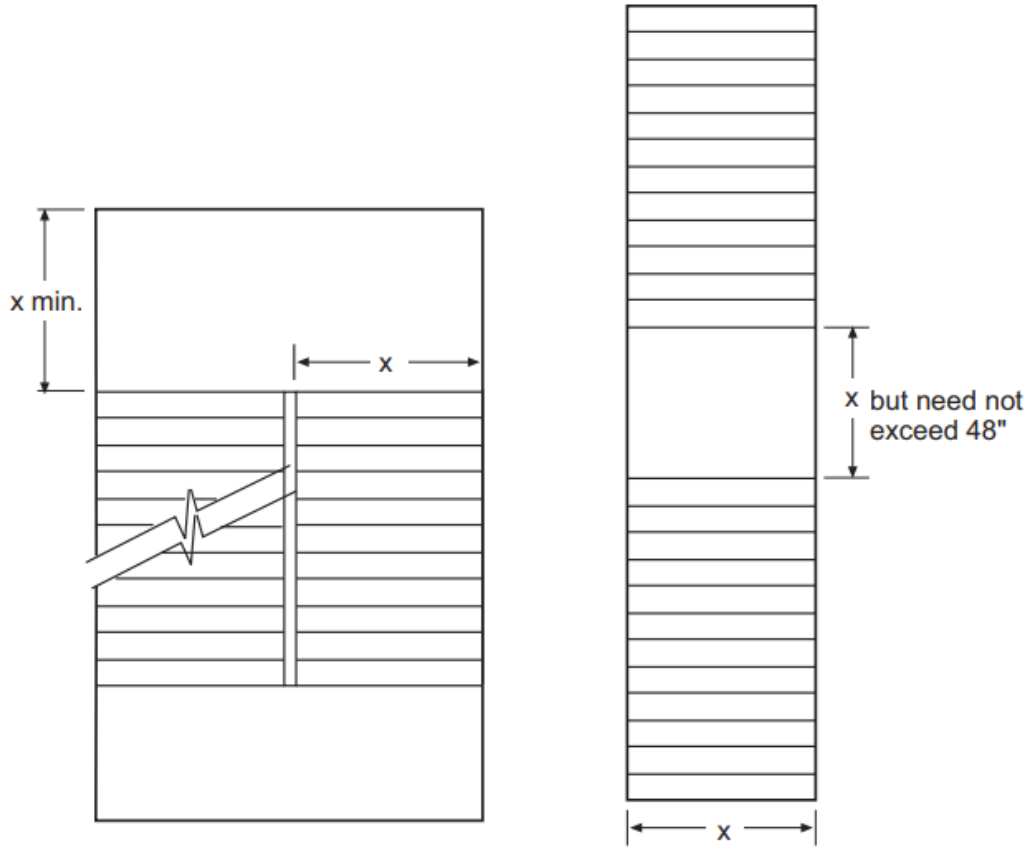
Source: 2021 IBC

1011.6 Stairway Landing

- There shall be a floor or landing at the top and bottom of each stairway. The width of landings, measured perpendicular to the direction of travel, shall be not less than the width of stairways served. Every landing shall have a minimum depth measured parallel to the direction of travel, equal to the width of the stairway or 48 inches (1219 mm), whichever is less. See the exception for stepped aisles.
- A landing that serves a stairway is required to have a length equal to or greater than the stairway width unless the stairway has a straight run. This measurement is based on the actual width of the stairway, not the required width. It is important to ensure that the capacity of the stairway is not reduced as occupants travel between stairway flights. A maximum length of 48 inches is acceptable for straight stairway travel, insofar as the capacity is not reduced for travel through the landing.

Source: 2021 IBC

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

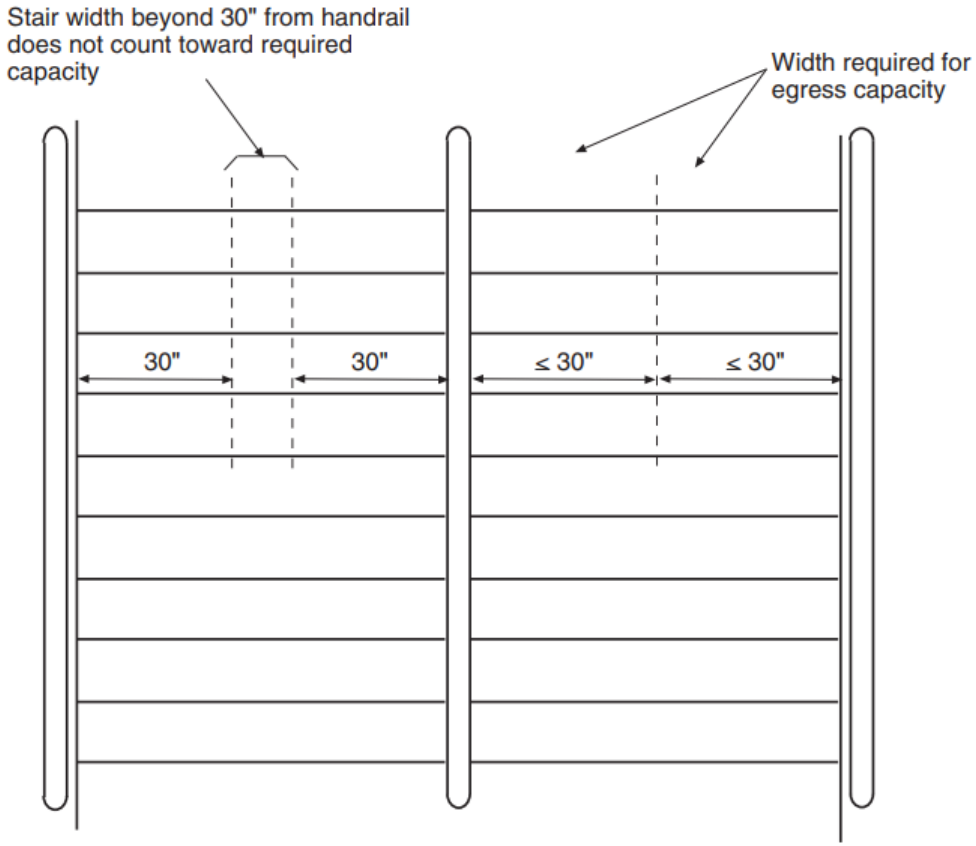
1011.11, 1014.9 Handrail Locations

Stair Railing and Guard Building Code Guidelines (thespruce.com)

- Flights of stairways shall have handrails on each side and shall comply with Section 1014. See the four exceptions where a single handrail or no handrail is required. Stairways shall have intermediate handrails located in such a manner so that all portions of the stairway minimum width or required capacity are within 30 inches (762 mm) of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.
- The handrail, a very important safety element of a stairway, must be located within relatively easy reach of every stair user. Therefore, in most applications, a rail must be provided on both sides of the stairway. In the case of extremely wide stairways, such as monumental stairs, the requirement for additional rails located throughout the width of the stairway is based on the required stairway width, not the actual width.

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.

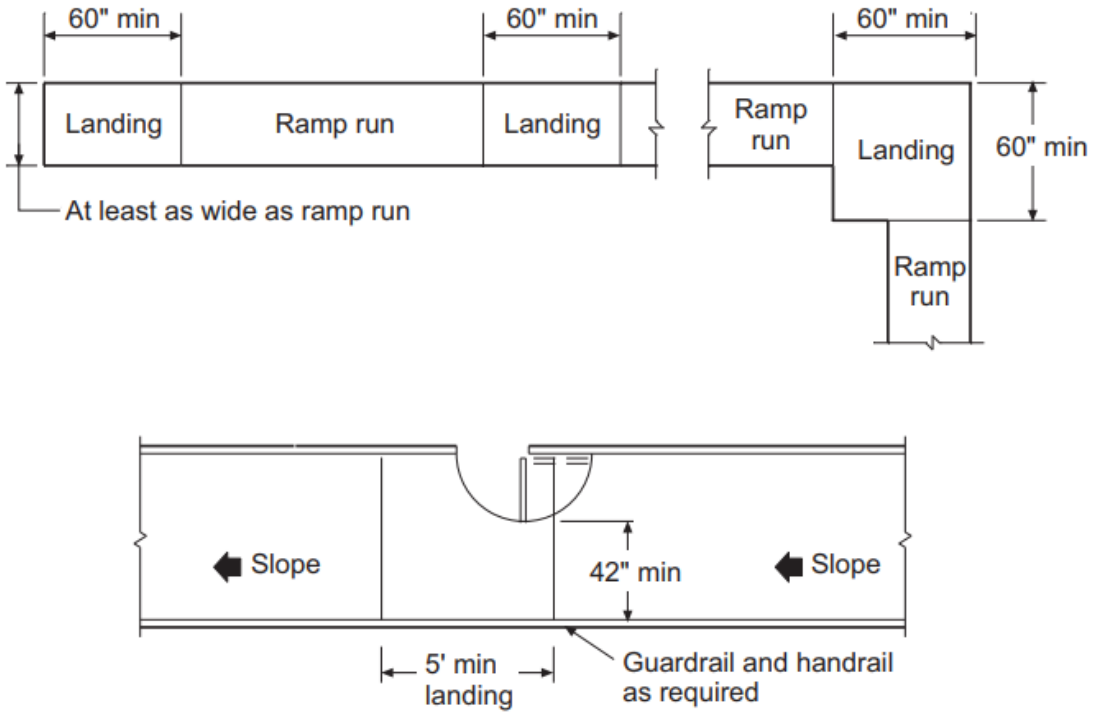
Source: 2021 IBC

1012 Slope, Rise, Width and Handrails

- Ramps used as part of a means of egress shall have a running slope not steeper than one unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian ramps shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope). The rise for any ramp run shall be 30 inches (762 mm) maximum. The minimum width and required capacity of a means of egress ramp shall not be less than that required for corridors by Section 1020.3. The clear width of a ramp between handrails, if provided, or other permissible projections shall be 36 inches (914 mm). Ramps with a rise greater than 6 inches (152 mm) shall have handrails on both sides. Handrails shall comply with Section 1014.
- Although many of the governing ramp provisions are designed for accessibility purposes, egress capabilities must also be considered. Handrails may project into the required ramp width up to 41/2 inches at each handrail at or below the handrail height, but in no case shall the clear width between handrails be less than 36 inches. A minimum headroom of 80 inches must be provided at all portions of the ramp.

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.

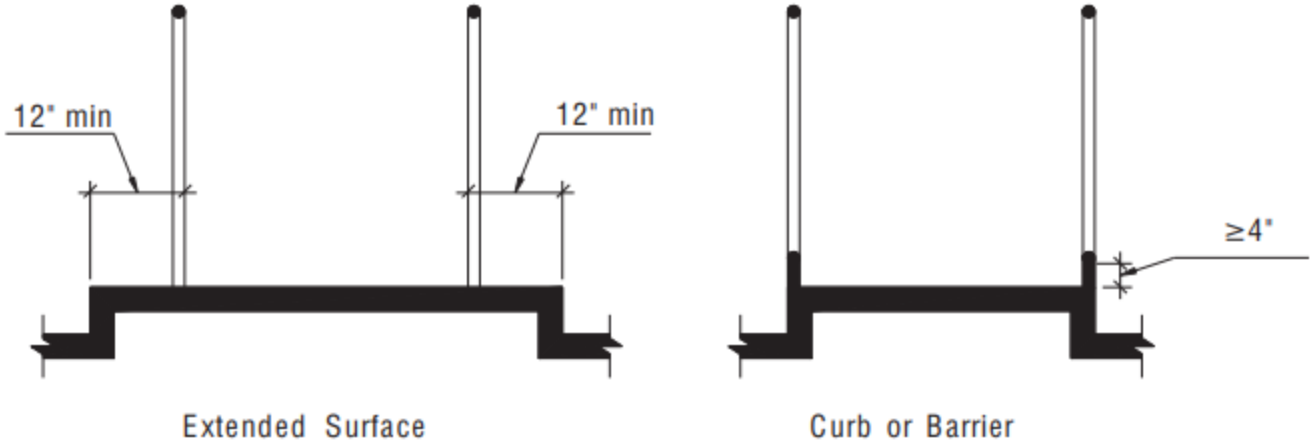
Source: 2021 IBC

1012.19 Edge Protection

- Edge protection complying with Sections 1012.10.1 (curb, rail, wall or barrier) or 1012.10.2 (extended floor or ground surface) shall be provided on each side of ramp runs and at each side of ramp landings. See the exceptions for curb ramps and ramp landings. A curb must be not less than 4 inches (102 mm) in height. Barriers shall be constructed so that the barrier prevents the passage of a 4-inch-diameter (102 mm) sphere, where any portion of the sphere is within 4 inches (102 mm) of the floor or ground surface, or the floor or ground surface of the ramp run or landing shall extend 12 inches (305 mm) minimum beyond the inside face of a handrail complying with Section 1014.
- Edge protection at ramps and ramp landings is necessary to prevent the wheels of a wheelchair from leaving the ramp or landing surface, or becoming lodged between the edge of the ramp and any adjacent construction. The protection is also beneficial to those individuals who utilize various forms of walking aids, including canes and crutches.

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.

Source: 2021 IBC

1013 Exit Signs

Exit Signs and Emergency Lighting Inspection - YouTube

SECTION 1013
EXIT SIGNS

1013.1 Where required. Exits and *exit access* doors shall be marked by an *approved* exit sign readily visible from any direction of egress travel. The path of egress travel to *exits* and within *exits* shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to the occupants. Intervening means of egress doors within *exits* shall be marked by exit signs. Exit sign placement shall be such that any point in an *exit access corridor* or *exit passageway* is within 100 feet (30 480 mm) or the *listed* viewing distance of the sign, whichever is less, from the nearest visible *exit* sign.

Source: 2021 IBC

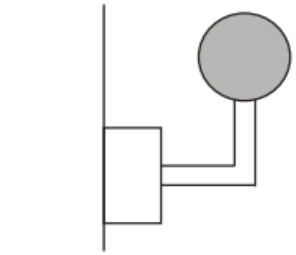
1014.2, 1014.3 Handrail Dimensions

- Handrail height, measured above stair tread nosings, or finish surface of ramp slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). See lower height range for alternating tread devices and ship ladders. Handrails with a circular cross section shall have an outside diameter of not less than 11 /4 inches (32 mm) and not greater than 2 inches (51 mm). Where the handrail is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than 61/4 inches (160 mm) with a maximum cross-section dimension of 21 /4 inches (57 mm) and a minimum cross-sectional dimension of 1 inch (25 mm). See allowances for Type II rails and those handrail shapes providing equivalent graspability.
- Handrail height shall be measured from the nosing of the treads to the top of the rail. Handrails located above or below this height range are not easily reached by most individuals. The shape of the rail should allow for easy grasping by most users.

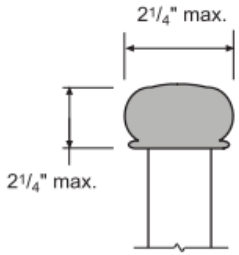
Source: 2021 IBC

1014.2, 1014.3 Handrail Dimensions

Geeking Out on Building Codes | Handrails - YouTube

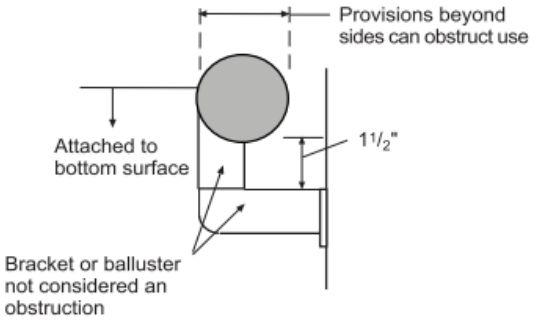


HANDRAIL with circular cross section: $1^1/_4$" min., 2" max. diameter or provide equivalent graspability

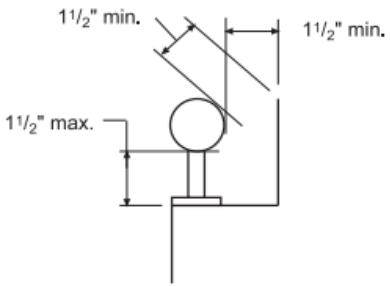


HANDRAIL that is not circular: perimeter of at least 4" but not greater than $6^1/_4$"

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 $1^1/_2$ 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 $4^1/_2$ inches.

Source: 2021 IBC

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

Contents

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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