

## Table of Contents

Mock Case Study Questions.....	02
Scenario.....	05
Program.....	06
Phase 1 Environmental Report.....	09
Climate Analysis.....	12
Portion of the Springfield Zoning Code.....	13
Zoning Map.....	18
Neighborhood Aerial Photo.....	19
IBC Excerpts.....	20

**Submit your answers to us to be eligible to win a free t-shirt and a one month Black Spectacles subscription!**

[Click here](#) to submit your answers for each question to us before the 12pm CT on 5/8.

1. How many drinking fountains are required in the building design? (Assume that the building is 40,000 sf gross area)
  - a. 1 drinking fountain
  - b. 4 drinking fountains
  - c. There is no requirement for drinking fountains in business occupancies
  - d. 2.5, rounded up to 3 drinking fountains
2. Which of the following structures / spans are most likely?
  - a. Concrete joist pan construction with 18' spans
  - b. Structural steel wide flange framing plan with 35' spans
  - c. Open web steel joists spanning 65' to masonry bearing walls
  - d. 2x12's at 16" o.c. with 24' spans
3. What hourly fire rating will be required for non-bearing partitions in the interior portion of the building (excluding demising walls)?  

---
4. In a fire emergency panic, how many rated stairwells are there required to be found in the floor plan to get people to safety?
  - a. 1 is required
  - b. 2 are required
  - c. 3 are required
  - d. 4 are required
5. Which of the following are likely to be part of the project (choose 3)?
  - a. Shallow floor plates to allow most spaces to have close access to operable windows
  - b. Vinyl window systems since they have the best R-values
  - c. Sun shading devices to allow maximum daylight and solar gain in the winter, but control the amount of solar gain in the summer
  - d. No elevators to encourage active healthy use of the stairs
  - e. Heavy timber construction
  - f. Green roof for storm-water control and garden amenity for office use

6. Where will the vapor barrier be located?
  - a. Just below the siding material
  - b. On the cold side of the insulation
  - c. Just inside the interior finish material
  - d. There is no vapor barrier in commercial buildings
7. Which of the following are most likely to be included on the site plan, landscaping plan and civil drawings?
  - a. Encapsulation details of the oil tank
  - b. A parking lot for 90 cars
  - c. A line of deciduous trees for wind control
  - d. Storm-water runoff systems
8. Which of the following will likely be included in the fenestration system?  
(Choose 3 that apply)
  - a. Low e coating on surface 1 (of double glazed windows) on the south side
  - b. Reflective sills and horizontal mullions to reflect light deep into the office space
  - c. Low e coating on surface 2 (of a double glazed windows) on the SE side
  - d. Low e coating on one of the double glazed window surfaces on the north side
  - e. Window system with a high U value
  - f. Laminated glass at all skylight locations
9. Standpipe access will be where:
  - a. East side of the site
  - b. Typical cleanouts will be at each direction change
  - c. Facing the sidewalk
  - d. Rooftop connection to the RTU
10. Given the environmental concerns on the site, you the architect should recommend that the owner do which of the following?
  - a. Remove the first 3' of contaminated soil and follow the Phase One recommendations
  - b. Get a Phase 2 Environmental Report
  - c. Remove the found asbestos, lead, and underground oil tank
  - d. Encapsulate the site with concrete pad and prepare for testing

11. What is the FAR and approximate allowable buildable area for this site and occupancy and is this enough to meet the needs of the client?
- a. FAR = 2.2, Approx. Allowable Buildable Area = 44,000 sf, yes, meets needs
  - b. FAR = 5, Approx. Allowable Buildable Area = 50,000 sf, no, does not meet needs
  - c. FAR = 3, Approx. Allowable Buildable Area = 60,000 sf, yes, meets needs
  - d. FAR = 3.5, Approx. Allowable Buildable Area = 70,000 sf, yes, meets needs

# JMPSTR!

## SCENARIO:

You are the architect for a new office building for a small to mid size business, it is a new technology company called “JMPSTR!”. That business has needs that will be obvious (Administration, Financial department, Marketing, Etc.) and less obvious (“Prototyping”). The Client has some specific ideas about how the work place should operate, what it should feel like, how people communicate, essentially what the experience should be like working there. But there are certain realities that must be dealt with as well, such as a site that has had previous uses (and their attendant contaminations), and a City that is intent on us following the zoning rules.

There are a few questions that cover issues covered by all of the supporting documents. Some issues may be answerable by just reviewing one document, others may have to be interpolated between multiple pieces of information for multiple sources.

JMPSTR!

# JMPSTR!

Program for new office

Provided by the JMPSTR! management

## GENERAL:

### General Information:

Location:	Springfield
Project:	New construction for new office and accessory spaces for tech start-up company

### Mission:

To provide a new, state of the art, tech start-up office and prototyping facility that brings joy and efficiency to the workers, enhances the neighborhood, and protects the environment.

### Goals:

1. High performance building
2. Efficient groupings for the office departments
3. Informal communications a priority
4. Declares itself as the state of the art headquarters that it will be
5. Open and transparent sensibility
6. Respectful of the neighborhood, but modern in sensibility
7. Encouraging of transit options
8. Impressive for visitors
9. Meaningfully divided into groups that enhance production, production and prototyping should be ground floor for ease of loading and unloading, main administrative offices should be second floor, third floor for worker minions
10. Organized around an inward focus courtyard / atrium to create a “world of our own”
11. Form should be layered to express flexibility and complexity of the work inside
12. Natural light for all
13. Everyone gets a connection to the exterior

## DATA COLLECTION RESULTS FROM DISCUSSIONS AND INTERVIEWS:

### General Data:

Site:	20,000 sf
	170' street frontage on main "pedestrian street"
Employees:	Admin: 15
	Marketing: 30
	Financial: 25
	Design: 35
	Engineers: 70
	Prototyping: 20
	<u>Facilities: 5</u>
	TOTAL: 220 employees
	<u>Growth 20% 40</u>
	FUTURE: 240 employees

BUILDING SIZE: Approximately 40,000 sf (above ground)  
Presumed 4 stories at approximately 10,000 sf per floor

BY DEPARTMENT:	Admin: 1500 sf
	Marketing: 2500 sf
	Financial: 2500 sf
	Design 1: 1500 sf (Graphics, user interface)
	Design 2: 1500 sf (Prototype team)
	Engineers 1: 2000 sf (Handheld team)
	Engineers 2: 2000 sf (full scale build out team)
	Engineers 3: 3000 sf (infrastructure team)
	Prototyping: 4000 sf
	Facilities: 500 sf

Shared:	1500 sf
Storage:	1500 sf
Mechanical:	3500 sf
Circulation:	6500 sf
TOTAL:	34,000 sf
Growth	6000 sf
<b>FUTURE:</b>	<b>40,000 sf</b>

## **CONCLUSIONS:**

Priorities:

1. Efficient
2. Exciting
3. Flexible
4. Environmental

## **Problem Statement**

Create a 4 story building that has a modern, sophisticated look demonstrated through its clever use of layering and transparencies. The building should be efficient and environmentally well balanced, giving everyone opportunities for fresh air and light, but focus on clear opportunities for communication and efficiency.



# ENVIRONMENTAL PHASE 1

REPORT FOR: **2845 North Collector Ave, Springfield**

Date of inspection: August 22, 2018

Weather: Sunny 80 F

Report Date: August 24, 2016

Report by: Black Spectacles Environmental

Address: We are everywhere

Client Information: JMPSTR

New construction office for tech start up

## GENERAL INFORMATION:

Site has been previously built on and has some materials left from previous demo, including foundations and other improvements.

## Environmental Professional Certification:

I declare that this environmental report is completely made up for the purpose of education only, do not assume that this is anything real.

---

(Real Person, Principal)

## **EXECUTIVE SUMMARY:**

### **Findings on Site:**

1. The subject property had an active fuel tank for oil storage for many years in rear NE corner of site. Looks to be small, perhaps 100 gallon.
2. Typical evidence of previous construction, concrete and rubble stone foundations, and related materials.
3. Minor indications of asbestos tiles still visible on left over materials.
4. Due to the age of the previous building, assumption of lead paint on some leftover materials.
5. No other major findings found.

### **Findings Off-Site:**

1. Municipal research shows there was a registered oil tank on the site.
2. Previous building was a manufacturing and sales structure built in 1905, and torn down in 1967.
3. Site has been empty (except for temporary uses) since the 1967 tear down.
4. Recent environmental reports from the nearby site to the SE were recorded with the municipality within the last 18 months and showed no general expectations for soil contaminations (other than the oil tank found on the site).
5. No other major findings found.

### **Issues:**

- |   |               |
|---|---------------|
| • Possible soil contamination from oil tank       | High Risk     |
| • Possible soil contamination from asbestos tiles | Moderate Risk |
| • Possible soil contamination from lead paint     | Moderate Risk |

### **Executive Summary, Conclusions and Recommendations:**

Based on the information found on site and researched at the local municipal records department, the following recommendations are presented:

1. A Phase 2 Report will be required for this site.
2. Suspect lead-based paint, friable and non-friable ACM's must be properly addressed for future site improvements. Develop an O & M Plan to properly address materials that could pose a risk to the building occupants or maintenance workers.

3. Using a Geoprobe, conduct multiple soil borings throughout the rear of the property near the underground storage tanks. Submit samples for lab testing to see extent of contamination in surrounding soils. Test for oil contaminants, VOC contaminants, semi-VOC contaminants, and RCRA Heavy metals.
4. Perform tests to locate any possible lead pipes located on the property from previous building use.

**Cost Estimate:**

1.	Phase 2	\$00,000
2.	Testing and removal of lead and friable material	\$00,000
3.	Site borings tests	\$00,000
4.	Testing of boring samples	\$00,000
5.	Lead pipe locations services and removal	\$00,000

**END OF EXECUTIVE SUMMARY**

(please see full report for further information)

# JMPSTR!

## CLIMATE ANALYSIS AND ENVIRONMENTAL PROPOSALS:

Climate analysis compiled by Black Spectacles Climate Consultants

### CLIMATE GENERAL INFORMATION:

General Information:

Climate type:	Temperate
Latitude:	40 degrees latitude
Average winter:	Low: 15 F, High: 35 F, Occasional snow, typical 1" to 6"
Average Spring:	Low: 40 F, High: 55 F, Generally sunny, some rain, rare snow
Average Summer:	Low: 65 F, High: 85 F, Generally sunny, occasional summer T-Storms
Average Fall:	Low – 40 F, High – 55 F, Crisp, sunny, windy

Site Info:

Site faces to SW, with generous sunlight (perhaps too much). Mostly low buildings surrounding (max 3.5 stories), therefore only shadowed close to property line. Building site to SE is currently open and could be a building as tall as 65' and therefore could cast a shadow on our site.

Soil is contaminated from a previous building, however below the previous disturbance the soils seem to be reasonable sandy-gravel (approximate 4000 psf) with bedrock below at approximately 40' below grade.

### PROPOSALS:

1. Natural daylight capture
2. Block solar gain in summer, accept solar gain in winter
3. Geo-thermal?
4. Operable windows or venting controlled locally
5. Controlled cross ventilation opportunities
6. Green roof opportunities (can be shared use with employee break areas / party rooms)
7. Stormwater runoff handled on site with green roof systems, porous pavers, underground storage detention systems, and French drains / bioswales
8. Night-sky lighting (minimal and downward focus)
9. Extra bike racks, shower room

### \*\*\* Portion of the Springfield Zoning Code \*\*\*

#### 0403 Floor Area Ratio.

**0403-A Standards.** All development in B and C districts is subject to the following maximum *floor area ratio* standards:

##### **District Maximum Floor Area Ratio – For the B and C Districts**

Dash 1	1.2
Dash 1.5	1.5
Dash 2	2.2
Dash 3	3.0
Dash 5	5.0

(See Sec. 17-17-0305 for rules governing the measurement of *floor area ratio*.)

#### **0403-B FAR Increase for Transit-Served Locations.**

All projects in B dash 3 and C dash 3 districts located within 1,320 feet of a rail station entrance or within 2,640 feet of a rail station (or other significant transit stop) entrance when the subject building is located along a pedestrian street or a pedestrian retail street, may increase the maximum floor area ratio standard to 3.5.

#### **0403-C Additional FAR Increase for On-Site Affordable Housing Units in**

##### **Transit-Served Locations.**

All projects in B dash 3 and C dash 3 districts subject to Sec. 2-45- 115 that qualify for and are granted a floor area ratio increase of 0.5 under Sec. 17-3-0403-B above are eligible for additional floor area ratio increases as follows: (1) projects that provide at least 50% of the required affordable units on-site may increase the maximum floor area ratio standard by an additional 0.25 to 3.75, and (2) projects that provide 100% of the required affordable units on-site may increase the maximum floor area ratio standard by an additional 0.5 to 4.0. These floor area ratio increases are allowed only if the project is reviewed and approved in accordance with the Type 1 Zoning Map Amendment procedures of Sec. 17-13-0302, or the planned development procedures of Sec. 17-13-0600.

#### **0404 Front Setbacks.**

No *front setback* is required in B or C districts, except on B- or C-zoned *lots* abutting R-zoned *lots* that have *lot frontage* on the same *street*. The required *front setback* in those cases must equal at least 50% of the *front yard* that exists on the abutting R-zoned *lot*. If the abutting R-zoned *lot* is vacant, the 50% must be calculated on the basis of the abutting *lot's* required *front setback*. (See Sec. 17-17-0306 for rules governing the measurement of *front setbacks*.)

#### **0405 Rear and Side Setbacks.**

All development in B and C districts is subject to the following minimum *rear setback* standards:

#### 0405-A

For floors containing *dwelling units*, the minimum *rear setback* is 30 feet. This does not apply to existing *buildings* where there is a change of use or interior alterations and where there are no additions to the existing structure which are proposed within the *rear setback*.

(See Sec. 17-17-0307 for rules governing the measurement of *rear setbacks*.)

#### 0405-B

For floors without *dwelling units*:

1. When the *rear property line* of B- or C-zoned property abuts a *side property line* of R-zoned property, a *rear setback* is required on the B- or C- zoned property that is equal in dimension to the minimum *side setback* required for a *residential building* on the adjacent R-zoned *lot*.
2. When the *rear property line* of B- or C-zoned property abuts a *rear property line* of R-zoned property, the minimum *rear setback* for the B- or C- zoned property is 16 feet. In such cases, the *rear setback* may begin 15 feet or one *story* above *grade*, whichever is lower.

#### 0406 Side Setbacks.

No *side setbacks* are required in B and C districts, except as restricted in 0405.

#### 0408 Building Height.

##### 0408-A Standards.

Maximum *building height* limits in B and C districts vary by building type and *lot frontage*, as follows:

##### Maximum Building Height (feet)

Buildings with Ground-floor Commercial Space

District	Lot frontage of 25 feet or less	Lot frontage of more than 25 and less than 50 feet	Lot frontage of 50 to 99.9 feet	Lot frontage of 100' feet or more	
B or C Dash 1	38	38	38	38	
B or C Dash 1.5	38	38	38	38	
B or C Dash 2	38	50	60	65	
B or C Dash 3	50	50	65	65	
B or C Dash 5	50	55	70	80	

## Maximum Building Height (feet)

### Buildings without Ground-floor Commercial Space

District	Lot frontage of 25 feet or less	Lot frontage of more than 25 and less than 50 feet	Lot frontage of 50 to 99.9 feet	Lot frontage of 100' feet or more	
B or C Dash 1	38	38	38	38	
B or C Dash 1.5	38	38	38	38	
B or C Dash 2	38	40	50	55	
B or C Dash 3	40	40	55	55	
B or C Dash 5	40	45	60	70	

Notes: See Sec. 17-17-0311 for rules governing the measurement of *building height*.

On lots with multiple lot frontages, allowable building height must be based on the shortest lot frontage.

[1] Buildings may exceed the maximum height standard applicable to 100+-foot lots in dash 5 districts only if reviewed and approved in accordance with the *Planned Unit Development* procedure; no minimum land area standard applies to projects seeking such PUD approval.

### 0408-B Building Height Increase for Transit-Served Locations.

1. All projects in B dash 3 and C dash 3 districts located within 1,320 feet of a rail station entrance (or other significant transit stop) are eligible for increases in maximum building height as established in the table below. These building height increases are allowed only if the project is reviewed and approved in accordance with the Type I Zoning Map Amendment procedures, or the planned unit development procedures.

### 0504-A Parking Location.

All off-street parking spaces must be enclosed or located to the rear of the *principal building* and not be visible from the right-of-way of a *pedestrian street*.

### 0504-B Off-Street Parking Requirements.

No off-street parking is required for nonresidential uses on *lots* abutting *pedestrian streets* unless such uses exceed 10,000 square feet of gross floor area, in which case off-street parking must be provided for the floor area in excess of 10,000 square feet.

USE		Auto parking req.s	Bike parking req.s
RESIDENTIAL 1	Single family and duplex units	1.5 spaces per unit	none
RESIDENTIAL 2	Townhouse units	1.5 spaces per unit	none

RESIDENTIAL 3	Multifamily units	1 space per unit	1 per 5 units
COMMERCIAL 1	Residential commercial focus	No spaces for first 4000 sf, 1 space for every 1000sf after	4
COMMERCIAL 2	Pedestrian Street focus (any large scale commercial structure that faces more than 25' onto a "pedestrian street")	No spaces for first 10,000 sf, 1 space for every 1000 sf after	1 bike per each 5 auto parking spaces
COMMERCIAL 3	Large scale commercial	No spaces for first 10,000 sf, 1 space for every 1000sf after	1 bike per each 10 parking spaces
BUSINESS 1	Residential business focus	No spaces for first 4000 sf, 1 space for every 1000sf after	4
BUSINESS 2	Pedestrian Street focus (any large scale commercial structure that faces more than 25' onto a "pedestrian street")	No spaces for first 10,000 sf, 1 space for every 1000 sf after	1 bike per each 10 auto parking spaces
BUSINESS 3	Large scale business use	No spaces for first 10,000 sf, 1 space for every 1000sf after	1 bike per each 10 parking spaces
MANUFACTURING 1	Light manufacturing, small scale	Proposal to Zoning Department	1 per each 10 auto parking spaces
MANUFACTURING 2	Moderate to large scale manufacturing	Proposal to Zoning Department	1 per each 10 auto parking spaces

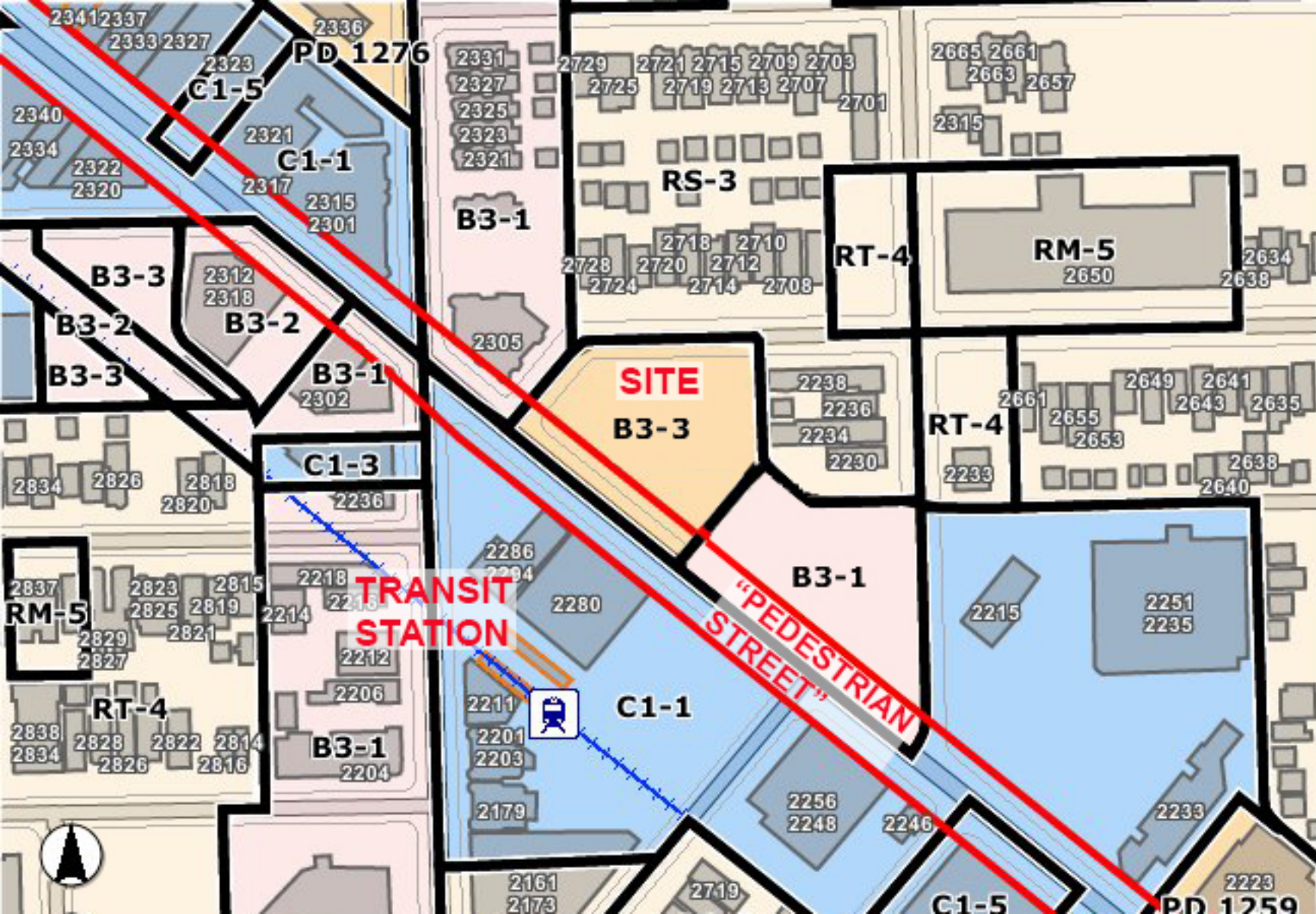
**0504-C Parking Count Decreases for Transit-Served Locations.**

1. All projects in B dash 3 and C dash 3 districts located within 1,320 feet of a rail station entrance (or other significant transit stop) are eligible for decreasing the parking count by 50%, upon approval of the Zoning Department.

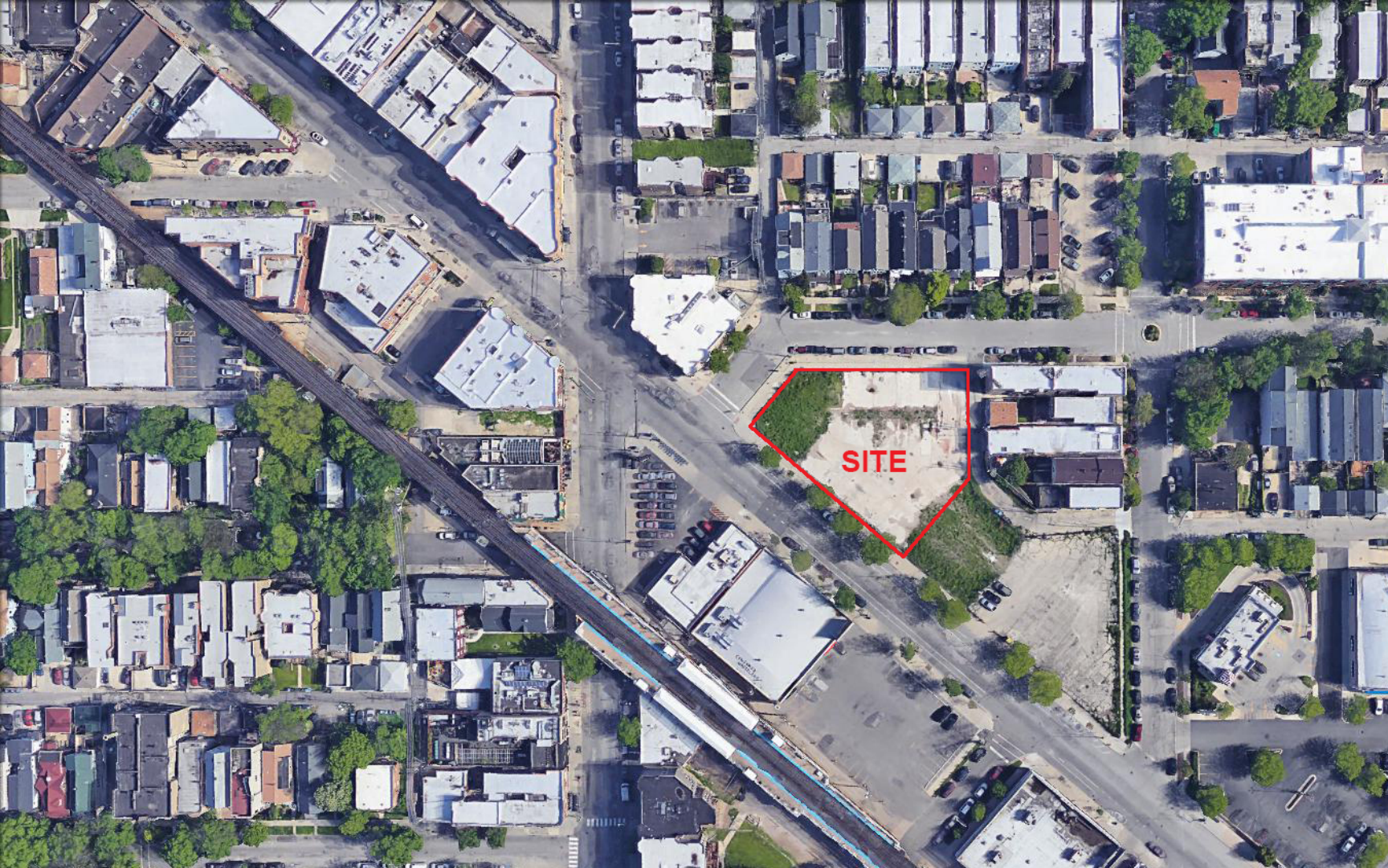
**0504-G Driveways and Vehicle Access.**



Vehicle access to *lots* located along *pedestrian streets* must come from an *alley*. No curb cuts or *driveways* are allowed from a *pedestrian street*.







**INTERNATIONAL BUILDING CODES EXERPTS**

**Table of Contents**

**CHAPTER 3 USE AND OCCUPANCY CLASSIFICATION .....21**

**CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS .....53**

**CHAPTER 6 TYPES OF CONSTRUCTION .....85**

**CHAPTER 10 MEANS OF EGRESS .....95**

**CHAPTER 29 PLUMBING SYSTEMS .....197**

## CHAPTER 3 USE AND OCCUPANCY CLASSIFICATION

*User note: Code change proposals to sections preceded by the designation [F] will be considered by the International Fire Code Development Committee during the 2016 (Group B) Code Development Cycle. See explanation on page iv.*

### SECTION 301 GENERAL

#### 301.1 Scope.

The provisions of this chapter shall control the classification of all buildings and structures as to use and occupancy.

### SECTION 302 CLASSIFICATION

#### 302.1 General.

Structures or portions of structures shall be classified with respect to occupancy in one or more of the groups listed in this section. A room or space that is intended to be occupied at different times for different purposes shall comply with all of the requirements that are applicable to each of the purposes for which the room or space will be occupied. Structures with multiple occupancies or uses shall comply with Section 508. Where a structure is proposed for a purpose that is not specifically provided for in this code, such structure shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard involved.

1. Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5.
2. Business (see Section 304): Group B.
3. Educational (see Section 305): Group E.
4. Factory and Industrial (see Section 306): Groups F-1 and F-2.
5. High Hazard (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4.
7. Mercantile (see Section 309): Group M.
8. Residential (see Section 310): Groups R-1, R-2, R-3 and R-4.
9. Storage (see Section 311): Groups S-1 and S-2.
10. Utility and Miscellaneous (see Section 312): Group U.

### SECTION 303 ASSEMBLY GROUP A

### **303.1 Assembly Group A.**

Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation.

#### **303.1.1 Small buildings and tenant spaces.**

A building or tenant space used for assembly purposes with an *occupant load* of less than 50 persons shall be classified as a Group B occupancy.

#### **303.1.2 Small assembly spaces.**

The following rooms and spaces shall not be classified as Assembly occupancies:

1. A room or space used for assembly purposes with an *occupant load* of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet (70 m<sup>2</sup>) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

#### **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.

#### **303.1.4 Accessory to places of religious worship.**

Accessory religious educational rooms and religious auditoriums with *occupant loads* of less than 100 per room or space are not considered separate occupancies.

### **303.2 Assembly Group A-1.**

Group A-1 occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures including, but not limited to:

Motion picture theaters

Symphony and concert halls

Television and radio studios admitting an audience

Theaters

### **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

**303.4 Assembly Group A-3.**

Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A including, but not limited to:

Amusement arcades

Art galleries

Bowling alleys

Community halls

Courtrooms

Dance halls (not including food or drink consumption) Exhibition halls

Funeral parlors

Gymnasiums (without spectator seating)

Indoor *swimming pools* (without spectator seating) Indoor tennis courts (without spectator seating)

Lecture halls

Libraries

Museums

*Places of religious worship*

Pool and billiard parlors

Waiting areas in transportation terminals

**303.5 Assembly Group A-4.**

Group A-4 occupancy includes assembly uses intended for viewing of indoor sporting events and activities with spectator seating including, but not limited to:

Arenas

Skating rinks

*Swimming pools*

Tennis courts

**303.6 Assembly Group A-5.**

Group A-5 occupancy includes assembly uses intended for participation in or viewing outdoor activities including, but not limited to:

Amusement park structures

*Bleachers*

*Grandstands*

Stadiums

**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

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<sup>2</sup>) 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).

### **304.2 Definitions.**

The following terms are defined in Chapter 2:

**AMBULATORY CARE FACILITY.**

**CLINIC, OUTPATIENT.**

## **SECTION 305 EDUCATIONAL GROUP E**

### **305.1 Educational Group E.**

Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

**305.1.1 Accessory to places of religious worship.**

Religious educational rooms and religious auditoriums, which are accessory to *places of religious worship* in accordance with Section 303.1.4 and have *occupant loads* of less than 100 per room or space, shall be classified as Group A-3 occupancies.

**305.2 Group E, day care facilities.**

This group includes buildings and structures or portions thereof occupied by more than five children older than 2<sup>1</sup>/<sub>2</sub> years of age who receive educational, supervision or *personal care services* for fewer than 24 hours per day.

**305.2.1 Within places of religious worship.**

Rooms and spaces within *places of religious worship* providing such day care during religious functions shall be classified as part of the primary occupancy.

**305.2.2 Five or fewer children.**

A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy.

**305.2.3 Five or fewer children in a dwelling unit.**

A facility such as the above within a *dwelling unit* and having five or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.

**SECTION 306 FACTORY GROUP F****306.1 Factory Industrial Group F.**

Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

**306.2 Moderate-hazard factory industrial, Group F-1.**

Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Aircraft (manufacturing, not to include repair) Appliances

Athletic equipment

Automobiles and other motor vehicles

Bakeries

Beverages: over 16-percent alcohol content

Bicycles

Boats

Brooms or brushes

Business machines

Cameras and photo equipment

Canvas or similar fabric

Carpets and rugs (includes cleaning) Clothing

Construction and agricultural machinery

Disinfectants

Dry cleaning and dyeing

Electric generation plants

Electronics

Engines (including rebuilding)

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

Furniture

Hemp products

Jute products

Laundries

Leather products

Machinery

Metals

Millwork (sash and door)

Motion pictures and television filming (without spectators)

Musical instruments

Optical goods

Paper mills or products

Photographic film

Plastic products

Printing or publishing

Recreational vehicles

Refuse incineration

Shoes

Soaps and detergents

Textiles

Tobacco

Trailers

Upholstering

Wood; distillation

Woodworking (cabinet)

### **306.3 Low-hazard factory industrial, Group F-2.**

Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

Beverages: up to and including 16-percent alcohol content

Brick and masonry Ceramic products

Foundries

Glass products

Gypsum

Ice

Metal products (fabrication and assembly)

## **SECTION 307 HIGH-HAZARD GROUP H**

### **[F] 307.1 High-hazard Group H.**

High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in *control areas* complying with Section 414, based on the maximum allowable quantity limits for *control areas* set forth in Tables 307.1(1) and 307.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this section, the requirements of Section 415 and the *International Fire Code*. Hazardous materials stored, or used on top of roofs or canopies, shall be classified as outdoor storage or use and shall comply with the *International Fire Code*.

**TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD<sup>a, j, m, n, p</sup>**

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE <sup>b</sup>			USE-CLOSED SYSTEMS <sup>b</sup>			USE-OPEN SYSTEMS <sup>b</sup>	
			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 <sup>q</sup>	Loose Baled <sup>o</sup>	H-3	(100) (1,000)	NA	NA	(100) (1,000)	NA	NA	(20) (200)	NA
Combustible liquid <sup>c, i</sup>	II IIIA IIIB	H-2 or H-3 H-2 or H-3 NA	NA	120 <sup>d, e</sup> 330 <sup>d, e</sup> 13,200 <sup>e, f</sup>	NA	NA	120 <sup>d</sup> 330 <sup>d</sup> 13,200 <sup>f</sup>	NA	NA	30 <sup>d</sup> 80 <sup>d</sup> 3,300 <sup>f</sup>
Consumer fireworks	1.4G	H-3	125 <sup>e, l</sup>	NA	NA	NA	NA	NA	NA	NA
Cryogenic flammable	NA	H-2	NA	45 <sup>d</sup>	NA	NA	45 <sup>d</sup>	NA	NA	10 <sup>d</sup>
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45 <sup>d</sup>	NA	NA	45 <sup>d</sup>	NA	NA	10 <sup>d</sup>
Explosives	Division 1.1	H-1 H-1 H-1 or H-2 H-3 H-3 H-1 H-1								
	Division 1.2									
	Division 1.3		1 <sup>e, g</sup>	(1) <sup>e, g</sup>		0.25 <sup>g</sup>	(0.25) <sup>g</sup>		0.25 <sup>g</sup>	(0.25) <sup>g</sup>
	Division 1.4		1 <sup>e, g</sup>	(1) <sup>e, g</sup>		0.25 <sup>g</sup>	(0.25) <sup>g</sup>		0.25 <sup>g</sup>	(0.25) <sup>g</sup>
	Division 1.5		5 <sup>e, g</sup>	(5) <sup>e, g</sup>		1 <sup>g</sup>	(1) <sup>g</sup>		1 <sup>g</sup>	(1) <sup>g</sup>
	Division 1.6		50 <sup>e, g</sup>	(50) <sup>e, g</sup>	NA	50 <sup>g</sup>	(50) <sup>g</sup>	NA	NA	NA
			125 <sup>d, e, l</sup>	NA		NA	NA		NA	NA
			1 <sup>e, g</sup>	(1) <sup>e, g</sup>		0.25 <sup>g</sup>	(0.25) <sup>g</sup>		0.25 <sup>g</sup>	(0.25) <sup>g</sup>
Flammable gas	Gaseous Liquefied	H-2	NA	NA (150) <sup>d, e</sup>	1,000 <sup>d, e</sup> NA	NA	NA (150) <sup>d, e</sup>	1,000 <sup>d, e</sup> NA	NA	NA
Flammable liquid <sup>c</sup>	IA IB and IC	H-2 or H-3	NA	30 <sup>d, e</sup> 120 <sup>d, e</sup>	NA	NA	30 <sup>d</sup> 120 <sup>d</sup>	NA	NA	10 <sup>d</sup> 30 <sup>d</sup>
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120 <sup>d, e, h</sup>	NA	NA	120 <sup>d, h</sup>	NA	NA	30 <sup>d, h</sup>

(continued)

**TABLE 307.1(1)—continued MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD<sup>a, j, m, n, p</sup>**

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE <sup>b</sup>			USE-CLOSED SYSTEMS <sup>b</sup>			USE-OPEN SYSTEMS <sup>b</sup>	
			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)
Flammable solid	NA	H-3	125 <sup>d, e</sup>	NA	NA	125 <sup>d</sup>	NA	NA	25 <sup>d</sup>	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1 <sup>e, g</sup>	(1) <sup>e, g</sup>	NA	0.25 <sup>g</sup>	(0.25) <sup>g</sup>	NA	0.25 <sup>g</sup>	(0.25) <sup>g</sup>
	I	H-2	5 <sup>d, e</sup>	(5) <sup>d, e</sup>		1 <sup>d</sup>	(1) <sup>d</sup>		1 <sup>d</sup>	(1) <sup>d</sup>
	II	H-3	50 <sup>d, e</sup>	(50) <sup>d, e</sup>		50 <sup>d</sup>	(50) <sup>d</sup>		10 <sup>d</sup>	(10) <sup>d</sup>
	III	H-3	125 <sup>d, e</sup>	(125) <sup>d, e</sup>		125 <sup>d</sup>	(125) <sup>d</sup>		25 <sup>d</sup>	(25) <sup>d</sup>
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1 <sup>g</sup>	(1) <sup>e, g</sup>	NA	0.25 <sup>g</sup>	(0.25) <sup>g</sup>	NA	0.25 <sup>g</sup>	(0.25) <sup>g</sup>
	3 <sup>k</sup>	H-2 or H-3	10 <sup>d, e</sup>	(10) <sup>d, e</sup>		2 <sup>d</sup>	(2) <sup>d</sup>		2 <sup>d</sup>	(2) <sup>d</sup>
	2	H-3	250 <sup>d, e</sup>	(250) <sup>d, e</sup>		250 <sup>d</sup>	(250) <sup>d</sup>		50 <sup>d</sup>	(50) <sup>d</sup>
	1	NA	4,000 <sup>e, f</sup>	(4,000) <sup>e, f</sup>		4,000 <sup>f</sup>	(4,000) <sup>f</sup>		1,000 <sup>f</sup>	(1,000) <sup>f</sup>
Oxidizing gas	Gaseous	H-3	NA	NA	1,500 <sup>d, e</sup>	NA	NA	1,500 <sup>d, e</sup>	NA	NA
	Liquefied			(150) <sup>d, e</sup>	NA		(150) <sup>d, e</sup>	NA		
Pyrophoric	NA	H-2	4 <sup>e, g</sup>	(4) <sup>e, g</sup>	50 <sup>e, g</sup>	1 <sup>g</sup>	(1) <sup>g</sup>	10 <sup>e, g</sup>	0	0
Unstable (reactive)	4	H-1	1 <sup>e, g</sup>	(1) <sup>e, g</sup>	10 <sup>e, g</sup>	0.25 <sup>g</sup>	(0.25) <sup>g</sup>	2 <sup>e, g</sup>	0.25 <sup>g</sup>	(0.25) <sup>g</sup>
	3	H-1 or H-2	5 <sup>d, e</sup>	(5) <sup>d, e</sup>	50 <sup>d, e</sup>	1 <sup>d</sup>	(1) <sup>d</sup>	10 <sup>d, e</sup>	1 <sup>d</sup>	(1) <sup>d</sup>
	2	H-3	50 <sup>d, e</sup>	(50) <sup>d, e</sup>	750 <sup>d, e</sup>	50 <sup>d</sup>	(50) <sup>d</sup>	750 <sup>d, e</sup>	10 <sup>d</sup>	(10) <sup>d</sup>
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5 <sup>d, e</sup>	(5) <sup>d, e</sup>	NA	5 <sup>d</sup>	(5) <sup>d</sup>	NA	1 <sup>d</sup>	(1) <sup>d</sup>
	2	H-3	50 <sup>d, e</sup>	(50) <sup>d, e</sup>		50 <sup>d</sup>	(50) <sup>d</sup>		10 <sup>d</sup>	(10) <sup>d</sup>
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m<sup>3</sup>, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and

cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in *listed* safety cans in accordance with Section 5003.9.10 of the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per *control area* of Class IA, IB or IC flammable liquids.

i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 603.3.2 of the *International Fire Code*.

j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

k. A maximum quantity of 200 pounds of solid or 20 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the *International Fire Code*.

n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).

o. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.

2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the *International Fire Code*.

3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.

4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.

5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code*. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.



**[F] TABLE 307.1(2) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIAL POSING A HEALTH HAZARD<sup>a, c, f, h, i</sup>**

MATERIAL	STORAGE <sup>b</sup>			USE-CLOSED SYSTEMS <sup>b</sup>			USE-OPEN SYSTEMS <sup>b</sup>	
	Solid pounds <sup>d, e</sup>	Liquid gallons (pounds) <sup>d, e</sup>	Gas cubic feet at NTP (pounds) <sup>d</sup>	Solid pounds <sup>d</sup>	Liquid gallons (pounds) <sup>d</sup>	Gas cubic feet at NTP (pounds) <sup>d</sup>	Solid pounds <sup>d</sup>	Liquid gallons (pounds) <sup>d</sup>
Corrosives	5,000	500	Gaseous 810 <sup>e</sup> Liquefied (150)	5,000	500	Gaseous 810 <sup>e</sup> Liquefied (150)	1,000	100
Highly Toxic	10	(10)	Gaseous 20 <sup>g</sup> Liquefied (4) <sup>g</sup>	10	(10)	Gaseous 20 <sup>g</sup> Liquefied (4) <sup>g</sup>	3	(3)
Toxic	500	(500)	Gaseous 810 <sup>e</sup> Liquefied (150) <sup>e</sup>	500	(500)	Gaseous 810 <sup>e</sup> Liquefied (150) <sup>e</sup>	125	(125)

For SI: 1 cubic foot = 0.028 m<sup>3</sup>, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.

h. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the *International Fire Code*.

### **[F] 307.1.1 Uses other than Group H.**

An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and

the *International Fire Code*.

2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the *International Fire Code*.

3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.

4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment *listed* by an *approved* testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour *fire barriers* constructed in accordance with Section 707 or 1-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).

6. Liquor stores and distributors without bulk storage.

7. Refrigeration systems.

8. The storage or utilization of materials for agricultural purposes on the premises.

9. Stationary batteries utilized for facility emergency power, uninterruptable power supply or telecommunication facilities, provided that the batteries are provided with safety venting caps and *ventilation* is provided in accordance with the *International Mechanical Code*.

10. Corrosive personal or household products in their original packaging used in retail display.

11. Commonly used corrosive building materials.

12. Buildings and structures occupied for aerosol storage shall be classified as Group S-1, provided that such buildings conform to the requirements of the *International Fire Code*.

13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per *control area* in Group M or S occupancies complying with Section 414.2.5.

14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the *International Fire Code*.

**[F] 307.1.2 Hazardous materials.**

Hazardous materials in any quantity shall conform to the requirements of this code, including Section 414, and the *International Fire Code*.

**[F] 307.2 Definitions.**

The following terms are defined in Chapter 2:

**AEROSOL**

**Level 1 aerosol products.**

**Level 2 aerosol products.**

**Level 3 aerosol products.**

**AEROSOL CONTAINER.**

**BALED COTTON.**

**BALED COTTON, DENSELY PACKED.**

**BARRICADE.**

**Artificial barricade.**

**Natural barricade.**

**BOILING POINT.**

**CLOSED SYSTEM.**

**COMBUSTIBLE DUST.**

**COMBUSTIBLE FIBERS.**

**COMBUSTIBLE LIQUID.**

**Class II.**

**Class IIIA.**

**Class IIIB.**

**COMPRESSED GAS.**

**CONTROL AREA.**

**CORROSIVE.**

**CRYOGENIC FLUID.**

**DAY BOX.**

**DEFLAGRATION.**

**DETONATION.**

**DISPENSING.**

**EXPLOSION.**

**EXPLOSIVE.**

**High explosive.**

**Low explosive.**

**Mass-detonating explosives.**

**UN/DOtn Class 1 explosives.**

**Division 1.1.**

**Division 1.2.**

**Division 1.3.**

**Division 1.4.**

**Division 1.5.**

**Division 1.6.**

**FIREWORKS.**

**Fireworks, 1.3G.**

**Fireworks, 1.4G.**

**FLAMMABLE GAS.**

**FLAMMABLE LIQUEFIED GAS.**

**FLAMMABLE LIQUID.**

**Class IA.**

**Class IB.**

**Class IC.**

**FLAMMABLE MATERIAL.**

**FLAMMABLE SOLID.**

**FLASH POINT.**

**HANDLING.**

**HAZARDOUS MATERIALS.**

**HEALTH HAZARD.**

**HIGHLY TOXIC.**

**INCOMPATIBLE MATERIALS.**

**INERT GAS.**

**OPEN SYSTEM.**

**OPERATING BUILDING.**

**ORGANIC PEROXIDE.**

**Class I.**

**Class II.**

**Class III.**

**Class IV.**

**Class V.**

**Unclassified detonable.**

**OXIDIZER.**

**Class 4.**

**Class 3.**

**Class 2.**

**Class 1.**

**OXIDIZING GAS.**

**PHYSICAL HAZARD.**

**PYROPHORIC.**

**PYROTECHNIC COMPOSITION.**

**TOXIC.**

**UNSTABLE (REACTIVE) MATERIAL.**

**Class 4.**

**Class 3.**

**Class 2.**

**Class 1.**

**WATER-REACTIVE MATERIAL.**

**Class 3.**

**Class 2.**

**Class 1.**

**[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

**[F] 307.3.1 Occupancies containing explosives not classified as H-1.**

The following occupancies containing explosive materials shall be classified as follows:

1. Division 1.3 explosive materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass explosion hazard shall be allowed in H-2 occupancies.

2. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in H-3 occupancies.

**[F] 307.4 High-hazard Group H-2.**

Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa).

Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

Cryogenic fluids, flammable.

Flammable gases.

Organic peroxides, Class I.

Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103 kPa).

Pyrophoric liquids, solids and gases, nondetonable.

Unstable (reactive) materials, Class 3, nondetonable.

Water-reactive materials, Class 3.

**[F] 307.5 High-hazard Group H-3.**

Buildings and structures containing materials that readily support combustion or that pose a physical hazard shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less.

Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

Consumer fireworks, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Flammable solids

Organic peroxides, Class II and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

**[F] 307.6 High-hazard Group H-4.**



Buildings and structures containing materials that are health hazards shall be classified as Group H-4. Such materials shall include, but not be limited to, the following:

Corrosives

Highly toxic materials

Toxic materials

**[F] 307.7 High-hazard Group H-5.**

Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those listed in Tables 307.1(1) and 307.1(2) shall be classified as Group H-5. Such facilities and areas shall be designed and constructed in accordance with Section 415.11.

**[F] 307.8 Multiple hazards.**

Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.

**SECTION 308 INSTITUTIONAL GROUP I**

**308.1 Institutional Group I.**

Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are not capable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

**308.2 Definitions.**

The following terms are defined in Chapter 2:

**24-HOUR BASIS.**

**CUSTODIAL CARE.**

**DETOXIFICATION FACILITIES.**

**FOSTER CARE FACILITIES.**

**HOSPITALS AND PSYCHIATRIC HOSPITALS.**

**INCAPABLE OF SELF-PRESERVATION.**

## **MEDICAL CARE.**

## **NURSING HOMES.**

### **308.3 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 308.3.1 or 308.3.2. 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

#### **308.3.1 Condition 1.**

This occupancy condition shall include buildings in which all persons receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

#### **308.3.2 Condition 2.**

This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

#### **308.3.3 Six to 16 persons receiving custodial care.**

A facility housing not fewer than six and not more than 16 persons receiving custodial care shall be classified as Group R-4.

#### **308.3.4 Five or fewer persons receiving custodial care.**

A facility with five or fewer persons receiving custodial care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

### **308.4 Institutional Group I-2.**

Institutional Group I-2 occupancy shall include buildings and structures used for *medical care* on a 24-hour basis for more than five persons who are *incapable of self-preservation*. This group shall include, but not be limited to, the following:

*Foster care facilities*

*Detoxification facilities*

*Hospitals*

*Nursing homes*

*Psychiatric hospitals*

#### **308.4.1 Occupancy conditions.**

Buildings of Group I-2 shall be classified as one of the occupancy conditions specified in Section 308.4.1.1 or 308.4.1.2.

##### **308.4.1.1 Condition 1.**

This occupancy condition shall include facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to nursing homes and foster care facilities.

##### **308.4.1.2 Condition 2.**

This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to hospitals.

#### **308.4.2 Five or fewer persons receiving medical care.**

A facility with five or fewer persons receiving medical care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

#### **308.5 Institutional Group I-3.**

Institutional Group I-3 occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally *incapable of self-preservation* due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:

Correctional centers

Detention centers

Jails

Prerelease centers

Prisons

Reformatories

Buildings of Group I-3 shall be classified as one of the occupancy conditions specified in Sections 308.5.1 through 308.5.5 (see Section 408.1).

**308.5.1 Condition 1.**

This occupancy condition shall include buildings in which free movement is allowed from sleeping areas, and other spaces where access or occupancy is permitted, to the exterior via *means of egress* without restraint. A Condition 1 facility is permitted to be constructed as Group R.

**308.5.2 Condition 2.**

This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied *smoke compartment* to one or more other *smoke compartments*. Egress to the exterior is impeded by locked *exits*.

**308.5.3 Condition 3.**

This occupancy condition shall include buildings in which free movement is allowed within individual *smoke compartments*, such as within a residential unit comprised of individual *sleeping units* and group activity spaces, where egress is impeded by remotecontrolled release of *means of egress* from such a *smoke compartment* to another *smoke compartment*.

**308.5.4 Condition 4.**

This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.

**308.5.5 Condition 5.**

This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.

**308.6 Institutional Group I-4, day care facilities.**

Institutional Group I-4 occupancy shall include buildings and structures occupied by more than five persons of any age who receive *custodial care* for fewer than 24 hours per day by persons other than parents or guardians, relatives by blood, marriage or adoption, and in a place other than the home of the person cared for. This group shall

include, but not be limited to, the following:

Adult day care

Child day care

**308.6.1 Classification as Group E.**

A child day care facility that provides care for more than five but not more than 100 children 2 <sup>1</sup>/<sub>2</sub> years or less of age, where the rooms in which the children are cared for are located on a *level of exit discharge* serving such rooms and each of these child care rooms has an *exit* door directly to the exterior, shall be classified as Group E.

**308.6.2 Within a place of religious worship.**

Rooms and spaces within *places of religious worship* providing such care during religious functions shall be classified as part of the primary occupancy.

**308.6.3 Five or fewer persons receiving care.**

A facility having five or fewer persons receiving *custodial care* shall be classified as part of the primary occupancy.

**308.6.4 Five or fewer persons receiving care in a dwelling unit.**

A facility such as the above within a *dwelling unit* and having five or fewer persons receiving *custodial care* shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.

**SECTION 309 MERCANTILE GROUP M**

**309.1 Mercantile Group M.**

Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include, but not be limited to, the following:

Department stores

Drug stores Markets

Motor fuel-dispensing facilities

Retail or wholesale stores

Sales rooms

**309.2 Quantity of hazardous materials.**

The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single *control area* of a Group M

occupancy shall not exceed the quantities in Table 414.2.5(1).

## **SECTION 310 RESIDENTIAL GROUP R**

### **310.1 Residential Group R.**

Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code*.

### **310.2 Definitions.**

The following terms are defined in Chapter 2:

**BOARDING HOUSE.**

**CONGREGATE LIVING FACILITIES.**

**DORMITORY.**

**GROUP HOME.**

**GUEST ROOM.**

**LODGING HOUSE.**

**PERSONAL CARE SERVICE.**

**TRANSIENT.**

### **310.3 Residential Group R-1.**

Residential Group R-1 occupancies containing *sleeping units* where the occupants are primarily *transient* in nature, including:

*Boarding houses (transient)* with more than 10 occupants

*Congregate living facilities (transient)* with more than 10 occupants

*Hotels (transient)*

*Motels (transient)*

### **310.4 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

*Boarding houses* (nontransient) with more than 16 occupants

*Congregate living facilities* (nontransient) with more than 16 occupants

Convents

*Dormitories*

Fraternities and sororities

Hotels (nontransient)

*Live/work units*

Monasteries

Motels (nontransient)

Vacation timeshare properties

### **310.5 Residential Group R-3.**

Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*

*Boarding houses* (nontransient) with 16 or fewer occupants

*Boarding houses* (*transient*) with 10 or fewer occupants

Care facilities that provide accommodations for five or fewer persons receiving care

*Congregate living facilities* (nontransient) with 16 or fewer occupants

*Congregate living facilities* (*transient*) with 10 or fewer occupants

*Lodging houses* with five or fewer *guest rooms*

#### **310.5.1 Care facilities within a dwelling.**

Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

#### **310.5.2 Lodging houses.**

Owner-occupied *lodging houses* with five or fewer *guest rooms* shall be permitted to be constructed in accordance with the *International Residential Code*.

### **310.6 Residential Group R-4.**

Residential Group R-4 occupancy shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive *custodial care*. Buildings of Group R-4 shall be classified as one of the occupancy conditions specified in Section 310.6.1 or 310.6.2. 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

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.

#### **310.6.1 Condition 1.**

This occupancy condition shall include buildings in which all persons receiving custodial care, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

#### **310.6.2 Condition 2.**

This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

## **SECTION 311 STORAGE GROUP S**

### **311.1 Storage Group S.**

Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

#### **311.1.1 Accessory storage spaces.**

A room or space used for storage purposes that is less than 100 square feet (9.3 m<sup>2</sup>) in area and accessory to another occupancy shall be classified as part of that occupancy.



The aggregate area of such rooms or spaces shall not exceed the allowable area limits of Section 508.2.

**311.2 Moderate-hazard storage, Group S-1.**

Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

Aerosols, Levels 2 and 3

Aircraft hangar (storage and repair)

Bags: cloth, burlap and paper

Bamboos and rattan

Baskets

Belting: canvas and leather

Books and paper in rolls or packs

Boots and shoes

Buttons, including cloth covered, pearl or bone

Cardboard and cardboard boxes

Clothing, woolen wearing apparel

Cordage

Dry boat storage (indoor)

Furniture

Furs

Glues, mucilage, pastes and size

Grains

Horns and combs, other than celluloid

Leather Linoleum Lumber

Motor vehicle repair garages complying with the maximum allowable quantities of

hazardous materials listed in Table 307.1(1) (see Section 406.8)

Photo engravings

Resilient flooring

Silks

Soaps

Sugar

Tires, bulk storage of

Tobacco, cigars, cigarettes and snuff

Upholstery and mattresses

Wax candles

### **311.3 Low-hazard storage, Group S-2.**

Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic *trim*, such as knobs, handles or film wrapping. Group S-2 storage uses shall include, but not be limited to, storage of the following:

Asbestos

Beverages up to and including 16-percent alcohol in metal, glass or ceramic containers

Cement in bags

Chalk and crayons

Dairy products in nonwaxed coated paper containers

Dry cell batteries

Electrical coils

Electrical motors

Empty cans

Food products

Foods in noncombustible containers

Fresh fruits and vegetables in nonplastic trays or containers

Frozen foods

Glass

Glass bottles, empty or filled with noncombustible liquids

Gypsum board

Inert pigments

Ivory

Meats

Metal cabinets

Metal desks with plastic tops and *trim*

Metal parts

Metals

Mirrors

Oil-filled and other types of distribution transformers

Parking garages, open or enclosed

Porcelain and pottery

Stoves

Talc and soapstones

Washers and dryers

## **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 412.5)

Barns

Carports

Fences more than 6 feet (1829 mm) in height

Grain silos, accessory to a residential occupancy

Greenhouses

Livestock shelters

Private garages

Retaining walls

Sheds

Stables

Tanks

Towers

## CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

*User note: Code change proposals to sections preceded by the designation [F] will be considered by the International Fire Code Development Committee during the 2016 (Group B) Code Development Cycle. See explanation on page iv.*

### SECTION 501 GENERAL

#### 501.1 Scope.

The provisions of this chapter control the height and area of structures hereafter erected and *additions* to existing structures.

#### [F] 501.2 Address identification.

New and existing buildings shall be provided with *approved* address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of  $\frac{1}{2}$  inch (12.7 mm). Where required by the fire *code official*, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure. Address identification shall be maintained.

### SECTION 502 DEFINITIONS

#### 502.1 Definitions.

The following terms are defined in Chapter 2:

**AREA, BUILDING.**

**BASEMENT.**

**EQUIPMENT PLATFORM.**

**GRADE PLANE.**

## HEIGHT, BUILDING.

## MEZZANINE.

### SECTION 503 GENERAL BUILDING HEIGHT AND AREA LIMITATIONS

#### 503.1 General.

Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of stories and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of stories and *building area* provisions shall be applied independently. Each portion of a building separated by one or more *fire walls* complying with Section 706 shall be considered to be a separate building.

#### 503.1.1 Special industrial occupancies.

Buildings and structures designed to house special industrial processes that require large areas and unusual *building heights* to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the *building height*, number of stories and *building area* limitations specified in Sections 504 and 506.

#### 503.1.2 Buildings on same lot.

Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building where the *building height*, number of stories of each building and the aggregate *building area* of the buildings are within the limitations specified in Sections 504 and 506. The provisions of this code applicable to the aggregate building shall be applicable to each building.

#### 503.1.3 Type I construction.

Buildings of Type I construction permitted to be of unlimited tabular *building heights and areas* are not subject to the special requirements that allow unlimited area buildings in Section 507 or unlimited *building height* in Sections 503.1.1 and 504.3 or increased *building heights and areas* for other types of construction.

### SECTION 504 BUILDING HEIGHT AND NUMBER OF STORIES

### **504.1 General.**

The height, in feet, and the number of stories of a building shall be determined based on the type of construction, occupancy classification and whether there is an *automatic sprinkler system* installed throughout the building.

**Exception:** The *building height* of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited where the building is provided with an *automatic sprinkler system* or *automatic fire-extinguishing system* in accordance with Chapter 9 and is entirely surrounded by *public ways* or *yards* not less in width than one and one-half times the *building height*.

#### **504.1.1 Unlimited area buildings.**

The height of unlimited area buildings shall be designed in accordance with Section 507.

#### **504.1.2 Special provisions.**

The special provisions of Section 510 permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in Section 510.

#### **504.2 Mixed occupancy.**

In a building containing mixed occupancies in accordance with Section 508, no individual occupancy shall exceed the height and number of story limits specified in this section for the applicable occupancies.

#### **504.3 Height in feet.**

The maximum height, in feet, of a building shall not exceed the limits specified in Table 504.3.

**Exception:** Towers, spires, steeples and other roof structures shall be constructed of materials consistent with the required type of construction of the building except where other construction is permitted by Section 1510.2.5. Such structures shall not be used for habitation or storage. The structures shall be unlimited in height where of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable building height where of combustible materials (see Chapter 15 for additional requirements).

**TABLE 504.3<sup>a</sup> ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE**

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION										
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
		A	B	A	B	A	B	HT	A	B	
A, B, E, F, M, S, U	NS <sup>b</sup>	UL	160	65	55	65	55	65	50	40	
	S	UL	180	85	75	85	75	85	70	60	
H-1, H-2, H-3, H-5	NS <sup>c, d</sup>	UL	160	65	55	65	55	65	50	40	
	S										
H-4	NS <sup>c, d</sup>	UL	160	65	55	65	55	65	50	40	
	S	UL	180	85	75	85	75	85	70	60	
I-1 Condition 1, I-3	NS <sup>d, e</sup>	UL	160	65	55	65	55	65	50	40	
	S	UL	180	85	75	85	75	85	70	60	
I-1 Condition 2, I-2	NS <sup>d, f, e</sup>	UL	160	65	55	65	55	65	50	40	
	S	UL	180	85							
I-4	NS <sup>d, g</sup>	UL	160	65	55	65	55	65	50	40	
	S	UL	180	85	75	85	75	85	70	60	
R	NS <sup>d, h</sup>	UL	160	65	55	65	55	65	50	40	
	S13R	60	60	60	60	60	60	60	60	60	
	S	UL	180	85	75	85	75	85	70	60	

For SI: 1 foot = 304.8 mm.

**Note:** UL = Unlimited; 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.

- See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
- See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
- New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
- The NS value is only for use in evaluation of existing building height in accordance with the *International Existing Building Code*.
- New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies Condition 1, see Exception 1 of Section 903.2.6.
- New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the *International Fire Code*.
- For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
- New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

#### 504.4 Number of stories.

The maximum number of stories of a building shall not exceed the limits specified in Table 504.4.



**TABLE 504.4<sup>a, b</sup> ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE**

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION									
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-4	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
E	NS	UL	5	3	2	3	2	3	1	1
	S	UL	6	4	3	4	3	4	2	2
F-1	NS	UL	11	4	2	3	2	4	2	1
	S	UL	12	5	3	4	3	5	3	2
F-2	NS	UL	11	5	3	4	3	5	3	2
	S	UL	12	6	4	5	4	6	4	3
H-1	NS <sup>c, d</sup>	1	1	1	1	1	1	1	1	NP
	S									
H-2	NS <sup>c, d</sup>	UL	3	2	1	2	1	2	1	1
	S									
H-3	NS <sup>c, d</sup>	UL	6	4	2	4	2	4	2	1
	S									
H-4	NS <sup>c, d</sup>	UL	7	5	3	5	3	5	3	2
	S	UL	8	6	4	6	4	6	4	3
H-5	NS <sup>c, d</sup>	4	4	3	3	3	3	3	3	2
	S									
I-1 Condition 1	NS <sup>d, e</sup>	UL	9	4	3	4	3	4	3	2
	S	UL	10	5	4	5	4	5	4	3
I-1 Condition 2	NS <sup>d, e</sup>	UL	9	4	3	4	3	4	3	2
	S	UL	10	5						
I-2	NS <sup>d, f</sup>	UL	4	2	1	1	NP	1	1	NP
	S	UL	5	3						
I-3	NS <sup>d, e</sup>	UL	4	2	1	2	1	2	2	1
	S	UL	5	3	2	3	2	3	3	2
I-4	NS <sup>d, g</sup>	UL	5	3	2	3	2	3	1	1
	S	UL	6	4	3	4	3	4	2	2
M	NS	UL	11	4	2	4	2	4	3	1

	S	UL	12	5	3	5	3	5	4	2
--	---	----	----	---	---	---	---	---	---	---

(continued)

**TABLE 504.4<sup>a, b</sup>—continued ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE**

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION									
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-1	NS <sup>d, h</sup>	UL	11	4	4	4	4	4	3	2
	S13R	4	4						4	3
	S	UL	12	5	5	5	5	5	4	3
R-2	NS <sup>d, h</sup>	UL	11	4	4	4	4	4	3	2
	S13R	4	4						4	3
	S	UL	12	5	5	5	5	5	4	3
R-3	NS <sup>d, h</sup>	UL	11	4	4	4	4	4	3	3
	S13R	4	4						4	4
	S	UL	12	5	5	5	5	5	4	4
R-4	NS <sup>d, h</sup>	UL	11	4	4	4	4	4	3	2
	S13R	4	4						4	3
	S	UL	12	5	5	5	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	2
	S	UL	12	6	4	5	4	5	5	3
U	NS	UL	5	4	2	3	2	4	2	1
	S	UL	6	5	3	4	3	5	3	2

**Note:** 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.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.

b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.

c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.

d. The NS value is only for use in evaluation of existing building height in accordance with the *International Existing Building Code*.

e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.

f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the *International Fire Code*.

g. For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.

h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

## SECTION 505 MEZZANINES AND EQUIPMENT PLATFORMS

### 505.1 General.

*Mezzanines* shall comply with Section 505.2. *Equipment platforms* shall comply with Section 505.3.

### 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).

#### 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.

Where a room contains both a *mezzanine* and an *equipment platform*, the aggregate area of the two raised floor levels shall be not greater than two-thirds of the floor area of that room or space in which they are located.

### Exceptions:

1. The aggregate area of *mezzanines* in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.1.1 shall be not greater than two-thirds of the floor area of the room.
2. The aggregate area of *mezzanines* in buildings and structures of Type I or II construction shall be not greater than one-half of the floor area of the room in buildings and structures equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 and an *approved emergency voice/alarm communication system* in accordance with Section 907.5.2.2.

### **505.2.2 Means of egress.**

The *means of egress* for *mezzanines* shall comply with the applicable provisions of Chapter 10.

### **505.2.3 Openness.**

A *mezzanine* shall be open and unobstructed to the room in which such *mezzanine* is located except for walls not more than 42 inches (1067 mm) in height, columns and posts.

#### **Exceptions:**

1. *Mezzanines* or portions thereof are not required to be open to the room in which the *mezzanines* are located, provided that the *occupant load* of the aggregate area of the enclosed space is not greater than 10.
2. A *mezzanine* having two or more exits or access to exits is not required to be open to the room in which the *mezzanine* is located.
3. *Mezzanines* or portions thereof are not required to be open to the room in which the *mezzanines* are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the *mezzanine* area.
4. In industrial facilities, *mezzanines* used for control equipment are permitted to be glazed on all sides.
5. In occupancies other than Groups H and I, that are no more than two *stories* above *grade plane* and equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, a *mezzanine* having two or more *means of egress* shall not be required to be open to the room in which the *mezzanine* is located.

### **505.3 Equipment platforms.**

*Equipment platforms* in buildings shall not be considered as a portion of the floor below. Such *equipment platforms* shall not contribute to either the *building area* or the number of *stories* as regulated by Section 503.1. The area of the *equipment platform* shall not be included in determining the *fire area* in accordance with Section 903. *Equipment platforms* shall not be a part of any *mezzanine* and such platforms and the walkways, *stairways*, *alternating tread devices* and ladders providing access to an *equipment platform* shall not serve as a part of the *means of egress* from the building.

### **505.3.1 Area limitation.**

The aggregate area of all *equipment platforms* within a room shall be not greater than two-thirds of the area of the room in which they are located. Where an *equipment platform* is located in the same room as a *mezzanine*, the area of the *mezzanine* shall be determined by Section 505.2.1 and the combined aggregate area of the *equipment platforms* and *mezzanines* shall be not greater than two-thirds of the room in which they are located.

### **505.3.2 Automatic sprinkler system.**

Where located in a building that is required to be protected by an *automatic sprinkler system*, *equipment platforms* shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in Section 903.3.

### **505.3.3 Guards.**

*Equipment platforms* shall have *guards* where required by Section 1015.2.

## **SECTION 506 BUILDING AREA**

### **506.1 General.**

The floor area of a building shall be determined based on the type of construction, occupancy classification, whether there is an automatic sprinkler system installed throughout the building and the amount of building frontage on public way or open space.

#### **506.1.1 Unlimited area buildings.**

Unlimited area buildings shall be designed in accordance with Section 507.

#### **506.1.2 Special provisions.**

The special provisions of Section 510 permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in Section 510.

#### **506.1.3 Basements.**

Basements need not be included in the total allowable floor area of a building provided the total area of such basements does not exceed the area permitted for a one-story above grade plane building.

The allowable area of a building shall be determined in accordance with the applicable provisions of Sections 506.2.1 through 506.2.4 and Section 506.3.

**TABLE 506.2<sup>a, b</sup> ALLOWABLE AREA FACTOR ( $A_t$  = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET**

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S1									
	SM									
B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
E	NS	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
	S1	UL	UL	106,000	58,000	94,000	58,000	102,000	74,000	38,000
	SM	UL	UL	79,500	43,500	70,500	43,500	76,500	55,500	28,500
F-1	NS	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
	S1	UL	UL	100,000	62,000	76,000	48,000	134,000	56,000	34,000
	SM	UL	UL	75,000	46,500	57,000	36,000	100,500	42,000	25,500
F-2	NS	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
	S1	UL	UL	150,000	92,000	114,000	72,000	202,000	84,000	52,000
	SM	UL	UL	112,500	69,000	85,500	54,000	151,500	63,000	39,000
H-1	NS <sup>c</sup>	21,000	16,500	11,000	7,000	9.500	7,000	10,500	7,500	NP
	S1									
H-2	NS <sup>c</sup>	21,000	16,500	11,000	7,000	9.500	7,000	10,500	7,500	3,000
	S1									
	SM									
H-3	NS <sup>c</sup>	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
	S1									
	SM									



	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000
S-1	NS	UL	48,000	26,000	17,500	26,000	17,500	25,500	14,000	9,000
	S1	UL	192,000	104,000	70,000	104,000	70,000	102,000	56,000	36,000
	SM	UL	144,000	78,000	52,500	78,000	52,500	76,500	42,000	27,000
S-2	NS	UL	79,000	39,000	26,000	39,000	26,000	38,500	21,000	13,500
	S1	UL	316,000	156,000	104,000	156,000	104,000	154,000	84,000	54,000
	SM	UL	237,000	117,000	78,000	117,000	78,000	115,500	63,000	40,500
U	NS	UL	35,500	19,000	8,500	14,000	8,500	18,000	9,000	5,500
	S1	UL	142,000	76,000	34,000	56,000	34,000	72,000	36,000	22,000
	SM	UL	106,500	57,000	25,500	42,000	25,500	54,000	27,000	16,500

**Note:** UL = Unlimited; NP = Not permitted;

For SI: 1 square foot = 0.0929 m<sup>2</sup>.

NS = Buildings not equipped throughout with an automatic sprinkler system; S1 = Buildings a maximum of one story above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; SM = Buildings two or more stories above grade plane 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.

- a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
- b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
- c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
- d. The NS value is only for use in evaluation of existing building area in accordance with the *International Existing Building Code*.
- e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
- f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the *International Fire Code*.
- g. New Group I-4 occupancies see Exceptions 2 and 3 of Section 903.2.6.
- h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

### 506.2.1 Single-occupancy, one-story buildings.

The allowable area of a single-occupancy building with no more than one story above grade plane shall be determined in accordance with Equation 5-1:



where:

$A_a$  = Allowable area (square feet).

$A_t$  = Tabular allowable area factor (NS, S1, or S13R 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.

### **506.2.2 Mixed-occupancy, one-story buildings.**

The allowable area of a mixed-occupancy building with no more than one story above grade plane shall be determined in accordance with the applicable provisions of Section 508.1 based on Equation 5-1 for each applicable occupancy.

#### **506.2.2.1 Group H-2 or H-3 mixed occupancies.**

For a building containing Group H-2 or H-3 occupancies, the allowable area shall be determined in accordance with Section 508.4.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.

### **506.2.3 Single-occupancy, multistory buildings.**

The allowable area of a single-occupancy building with more than one story above grade plane shall be determined in accordance with Equation 5-2:

where:

$A_a$  = Allowable area (square feet).

$A_t$  = Tabular allowable area factor (NS, S13R 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).

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

$S_a$  = Actual number of building stories above grade plane, not to exceed three. For buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2, use the actual number of building stories above grade plane, not to exceed four.

No individual story shall exceed the allowable area ( $A_a$ ) as determined by

Equation 5-2 using the value of  $S_a = 1$ .

#### **506.2.4 Mixed-occupancy, multistory buildings.**

Each story of a mixed-occupancy building with more than one story above grade plane shall individually comply with the applicable requirements of Section 508.1. For buildings with more than three stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories, determined in accordance with Equation 5-3 based on the applicable provisions of Section 508.1, shall not exceed three.

where:

$A_a$  = Allowable area (square feet).

$A_t$  = Tabular allowable area factor (NS, S13R 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).

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

**Exception:** For buildings designed as separated occupancies under Section 508.4 and equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.2, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories determined in accordance with Equation 5-3 based on the applicable provisions of Section 508.1, shall not exceed four.

##### **506.2.4.1 Group H-2 or H-3 mixed occupancies.**

For a building containing Group H-2 or H-3 occupancies, the allowable area shall be determined in accordance with Section 508.4.2, with the sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.

#### **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.

### **506.3.2 Minimum frontage distance.**

To qualify for an area factor increase based on frontage, the public way or open space adjacent to the building perimeter shall have a minimum distance ( $W$ ) of 20 feet (6096 mm) measured at right angles from the building face to any of the following:

1. The closest interior lot line.
2. The entire width of a street, alley or public way.
3. The exterior face of an adjacent building on the same property.

Where the value of  $W$  is greater than 30 feet (9144 mm), a value of 30 feet (9144 mm) shall be used in calculating the building area increase based on frontage, regardless of the actual width of the public way or open space.

Where the value of  $W$  varies along the perimeter of the building, the calculation performed in accordance with Equation 5-5 shall be based on the weighted average calculated in accordance with Equation 5-4.

where:

$W$  (Width: weighted average) = Calculated width of public way or open space (feet).

$L_n$  = Length of a portion of the exterior perimeter wall.

$w_n$  = Width ( $\geq 20$  feet) of a public way or open space associated with that portion of the exterior perimeter wall.

$F$  = Building perimeter that fronts on a public way or open space having a width of 20 feet (6096 mm) or more.

**Exception:** Where a building meets the requirements of Section 507, as applicable, except for compliance with the minimum 60-foot (18 288

mm) *public way* or *yard* requirement, and the value of  $W$  is greater than 30 feet (9144 mm), the value of  $W$  shall not exceed 60 feet (18 288 mm).

### **506.3.3 Amount of increase.**

The area factor increase based on frontage shall be determined in accordance with Equation 5-5:

where:

$I_f$  = Area factor increase due to frontage.

$F$  = Building perimeter that fronts on a *public way* or open space having minimum distance of 20 feet (6096 mm).

$P$  = Perimeter of entire building (feet).

$W$  = Width of *public way* or open space (feet) in accordance with Section 506.3.2.

## **SECTION 507 UNLIMITED AREA BUILDINGS**

### **507.1 General.**

The area of buildings of the occupancies and configurations specified in Sections 507.1 through 507.12 shall not be limited. Basements not more than one story below grade plane shall be permitted.

#### **507.1.1 Accessory occupancies.**

Accessory occupancies shall be permitted in unlimited area buildings in accordance with the provisions of Section 508.2, otherwise the requirements of Sections 507.3 through 507.13 shall be applied, where applicable.

#### **507.2 Measurement of open spaces.**

Where Sections 507.3 through 507.13 require buildings to be surrounded and adjoined by *public ways* and *yards*, those open spaces shall be determined as follows:

1. Yards shall be measured from the building perimeter in all directions to the closest interior *lot lines* or to the exterior face of an opposing building located on the same *lot*, as applicable.

- 2 Where the building fronts on a *public way*, the entire width of the *public*

way shall be used.

#### **507.2.1 Reduced open space.**

The *public ways* or *yards* of 60 feet (18 288 mm) in width required in Sections 507.3, 507.4, 507.5, 507.6 and 507.12 shall be permitted to be reduced to not less than 40 feet (12 192 mm) in width provided all of the following requirements are met:

1. The reduced width shall not be allowed for more than 75 percent of the perimeter of the building.
2. The *exterior walls* facing the reduced width shall have a *fire-resistance rating* of not less than 3 hours.
3. Openings in the *exterior walls* facing the reduced width shall have opening protectives with a *fire protection rating* of not less than 3 hours.

#### **507.3 Nonsprinklered, one-story buildings.**

The area of a Group F-2 or S-2 building no more than one story in height shall not be limited where the building is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

#### **507.4 Sprinklered, one-story buildings.**

The area of a Group A-4 building no more than one *story above grade plane* of other than Type V construction, or the area of a Group B, F, M or S building no more than one story above grade plane of any construction type, shall not be limited where the building is provided with an *automatic sprinkler system* throughout 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.

#### **Exceptions:**

1. Buildings and structures of Type I or II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such buildings conform to the requirements of Sections 507.4 and 903.3.1.1 and Chapter 32 of the *International Fire Code*.
2. The *automatic sprinkler system* shall not be required in areas occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-4, provided that both of the following

criteria are met:

2.1. *Exit* doors directly to the outside are provided for occupants of the participant sports areas.

2.2. The building is equipped with a *fire alarm system* with *manual fire alarm boxes* installed in accordance with Section 907.

#### **507.4.1 Mixed occupancy buildings with Groups A-1 and A-2.**

Group A-1 and A-2 occupancies of other than Type V construction shall be permitted within mixed occupancy buildings of unlimited area complying with Section 507.4, provided all of the following criteria are met:

1. Group A-1 and A-2 occupancies are separated from other occupancies as required for separated occupancies in Section 508.4.4 with no reduction allowed in the *fire-resistance rating* of the separation based upon the installation of an *automatic sprinkler system*.

2. Each area of the portions of the building used for Group A-1 or A-2 occupancies shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1.

3. *Exit* doors from Group A-1 and A-2 occupancies shall discharge directly to the exterior of the building.

#### **507.5 Two-story buildings.**

The area of a Group B, F, M or S building no 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.

#### **507.6 Group A-3 buildings of Type II construction.**

The area of a Group A-3 building no more than one *story above grade plane*, used as a *place of religious worship*, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor *swimming pool* or tennis court of Type II construction, shall not be limited provided all of the following criteria are met:

1. The building shall not have a *stage* other than a *platform*.

2. The building shall be equipped throughout with an *automatic sprinkler*

*system* in accordance with Section 903.3.1.1.

3. The building shall be surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

#### **507.7 Group A-3 buildings of Type III and IV construction.**

The area of a Group A-3 building of Type III or IV construction, with no more than one *story above grade plane* and used as a *place of religious worship*, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor *swimming pool* or tennis court, shall not be limited provided all of the following criteria are met:

1. The building shall not have a *stage* other than a *platform*.

2. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all *exits* are provided with ramps complying with Section 1012 to the street or grade level.

4. The building shall be surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

#### **507.8 Group H-2, H-3 and H-4 occupancies.**

Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area buildings containing Group F or S occupancies in accordance with Sections 507.4 and 507.5 and the provisions of Sections 507.8.1 through 507.8.4.

##### **507.8.1 Allowable area.**

The aggregate floor area of Group H occupancies located in an unlimited area building shall not exceed 10 percent of the area of the building or the area limitations for the Group H occupancies as specified in Section 506 based on the perimeter of each Group H floor area that fronts on a *public way* or open space.

##### **507.8.1.1 Located within the building.**

The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the area limitations for the Group H occupancies as specified in Section 506.

#### **507.8.1.1.1 Liquid use, dispensing and mixing rooms.**

Liquid use, dispensing and mixing rooms having a floor area of not more than 500 square feet (46.5 m<sup>2</sup>) need not be located on the outer perimeter of the building where they are in accordance with the *International Fire Code* and NFPA 30.

#### **507.8.1.1.2 Liquid storage rooms.**

Liquid storage rooms having a floor area of not more than 1,000 square feet (93 m<sup>2</sup>) need not be located on the outer perimeter where they are in accordance with the *International Fire Code* and NFPA 30.

#### **507.8.1.1.3 Spray paint booths.**

Spray paint booths that comply with the *International Fire Code* need not be located on the outer perimeter.

#### **507.8.2 Located on building perimeter.**

Except as provided for in Section 507.8.1.1, Group H occupancies shall be located on the perimeter of the building. In Group H-2 and H-3 occupancies, not less than 25 percent of the perimeter of such occupancies shall be an *exterior wall*.

#### **507.8.3 Occupancy separations.**

Group H occupancies shall be separated from the remainder of the unlimited area building and from each other in accordance with Table 508.4.

#### **507.8.4 Height limitations.**

For two-story, unlimited area buildings, Group H occupancies shall not be located more than one *story above grade plane* unless permitted based on the allowable height and number of *stories* and feet as specified in Section 504 based on the type of construction of the unlimited area building.

#### **507.9 Unlimited mixed occupancy buildings with Group H-5.**

The area of a Group B, F, H-5, M or S building no 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, provided all of the following criteria are met:

1. Buildings containing Group H-5 occupancy shall be of Type I or II construction.



2. Each area used for Group H-5 occupancy shall be separated from other occupancies as required in Sections 415.11 and 508.4.

3. Each area used for Group H-5 occupancy shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1 including modifications of Section 506.

**Exception:** Where the Group H-5 occupancy exceeds the maximum allowable area, the Group H-5 shall be subdivided into areas that are separated by 2-hour fire barriers.

#### **507.10 Aircraft paint hangar.**

The area of a Group H-2 aircraft paint hangar no more than one *story above grade plane* shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.6 and is surrounded and adjoined by *public ways* or *yards* not less in width than one and one-half times the *building height*.

#### **507.11 Group E buildings.**

The area of a Group E building no more than one *story above grade plane*, of Type II, IIIA or IV construction, shall not be limited provided all of the following criteria are met:

1. Each classroom shall have not less than two *means of egress*, with one of the *means of egress* being a direct *exit* to the outside of the building complying with Section 1022.

2. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

3. The building is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

#### **507.12 Motion picture theaters.**

In buildings of Type II construction, the area of a motion picture theater located on the first *story above grade plane* shall not be limited where the building is provided with an *automatic sprinkler system* throughout 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.

**507.13 Covered and open mall buildings and anchor buildings.**

The area of *covered and open mall buildings* and *anchor buildings* not exceeding three *stories* in height that comply with Section 402 shall not be limited.

**SECTION 508 MIXED USE AND OCCUPANCY****508.1 General.**

Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

**Exceptions:**

1. Occupancies separated in accordance with Section 510.
2. Where required by Table 415.6.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in *adetached building* or structure.
3. Uses within *live/work units*, complying with Section 419, are not considered separate occupancies.

**508.2 Accessory occupancies.**

Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.4.

**508.2.1 Occupancy classification.**

Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

**508.2.2 Allowable building height.**

The allowable height and number of stories of the building containing accessory occupancies shall be in accordance with Section 504 for the main occupancy of the building.

**508.2.3 Allowable building area.**

The allowable area of the building shall be based on the applicable provisions of Section 506 for the main occupancy of the building. Aggregate accessory

occupancies shall not occupy more than 10 percent of the floor area of the story in which they are located and shall not exceed the tabular values for nonsprinklered buildings in Table 506.2 for each such accessory occupancy.

#### **508.2.4 Separation of occupancies.**

No separation is required between accessory occupancies and the main occupancy.

#### **Exceptions:**

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling or sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.

#### **508.3 Nonseparated occupancies.**

Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

##### **508.3.1 Occupancy classification.**

Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area. Where nonseparated occupancies occur in a *high-rise building*, the most restrictive requirements of Section 403 that apply to the nonseparated occupancies shall apply throughout the *high-rise building*.

##### **508.3.2 Allowable building area and height.**

The allowable *building area and height* of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

##### **508.3.3 Separation.**

No separation is required between nonseparated occupancies.

## Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from other occupancies contiguous to them in accordance with the requirements of Section 420.

### 508.4 Separated occupancies.

Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

**TABLE 508.4 REQUIRED SEPARATION OF OCCUPANCIES (HOURS)**

OCCUPANCY	A, E		I-1 <sup>a</sup> , I-3, I-4		I-2		R <sup>a</sup>		F-2, S-2 <sup>b</sup> , U		B <sup>e</sup> , F-1, M, S-1		H-1		H-2		H-3, H-4		H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	NP
I-1 <sup>a</sup> , I-3, I-4	—	—	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP
I-2	—	—	—	—	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP
R <sup>a</sup>	—	—	—	—	—	—	N	N	1 <sup>c</sup>	2 <sup>c</sup>	1	2	NP	NP	3	NP	2	NP	2	NP
F-2, S-2 <sup>b</sup> , U	—	—	—	—	—	—	—	—	N	N	1	2	NP	NP	3	4	2	3	2	NP
B <sup>e</sup> , F-1, M, S-1	—	—	—	—	—	—	—	—	—	—	N	N	NP	NP	2	3	1	2	1	NP
H-1	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	NP	NP	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP	1	NP	1	NP
H-3, H-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 <sup>d</sup>	NP	1	NP
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N	NP

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

N = No separation requirement.

NP = Not permitted.

a See Section 420.

b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but not to less than 1 hour.

c. See Section 406.3.4.

d. Separation is not required between occupancies of the same classification.

e. See Section 422.2 for ambulatory care facilities.

### 508.4.1 Occupancy classification.

Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building.

#### **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.

#### **508.4.3 Allowable height.**

Each separated occupancy shall comply with the *building height* limitations based on the type of construction of the building in accordance with Section 503.1.

**Exception:** Special provisions of Section 510 shall permit occupancies at *building heights* other than provided in Section 503.1.

#### **508.4.4 Separation.**

Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4.

##### **508.4.4.1 Construction.**

Required separations shall be *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.

## **SECTION 509 INCIDENTAL USES**

**TABLE 509 INCIDENTAL USES**

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and provide automatic sprinkler system

Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In ambulatory care facilities, laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour
In Group I-2, physical plant maintenance shops	1 hour
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater	1 hour
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet	1 hour
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptible power supplies	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m<sup>3</sup>.

### 509.1 General

Incidental uses located within single occupancy or mixed occupancy buildings shall comply with the provisions of this section. Incidental uses are ancillary functions associated with a given occupancy that generally pose a greater level of risk to that occupancy and are limited to those uses listed in Table 509.

**Exception:** Incidental uses within and serving a *dwelling unit* are not required to comply with this section.

### **509.2 Occupancy classification.**

Incidental uses shall not be individually classified in accordance with Section 302.1. Incidental uses shall be included in the building occupancies within which they are located.

### **509.3 Area limitations.**

Incidental uses shall not occupy more than 10 percent of the *building area* of the *story* in which they are located.

### **509.4 Separation and protection.**

The incidental uses listed in Table 509 shall be separated from the remainder of the building or equipped with an *automatic sprinkler system*, or both, in accordance with the provisions of that table.

#### **509.4.1 Separation.**

Where Table 509 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the *building* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. Construction supporting 1-hour *fire barriers* or *horizontal assemblies* used for incidental use separations in buildings of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.

#### **509.4.2 Protection.**

Where Table 509 permits an *automatic sprinkler system* without a *fire barrier*, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor assembly below to the underside of the ceiling that is a component of a fire-resistance-rated floor assembly or roof assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic-closing upon detection of smoke in accordance with Section 716.5.9.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80. Walls surrounding the incidental use shall not have air transfer openings unless provided with smoke dampers in accordance with Section 710.8.

##### **509.4.2.1 Protection limitation.**

Where an *automatic sprinkler system* is provided in accordance with Table 509, only the space occupied by the incidental use need be equipped with such a system.

## SECTION 510 SPECIAL PROVISIONS

### 510.1 General.

The provisions in Sections 510.2 through 510.9 shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable *building heights and areas* of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in this section for such condition and other applicable requirements of this code. The provisions of Sections 510.2 through 510.8 are to be considered independent and separate from each other.

### 510.2 Horizontal building separation allowance.

A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours.
2. The building below the *horizontal assembly* is of Type IA construction.
3. *Shaft, stairway, ramp* and escalator enclosures through the *horizontal assembly* shall have not less than a 2-hour *fire-resistance rating* with opening protectives in accordance with Section 716.5.

**Exception:** Where the enclosure walls below the *horizontal assembly* have not less than a 3-hour *fire-resistance rating* with opening protectives in accordance with Section 716.5, the enclosure walls extending above the *horizontal assembly* shall be permitted to have a 1-hour *fire-resistance rating*, provided:

1. The building above the *horizontal assembly* is not required to be of Type I construction;
2. The enclosure connects fewer than four *stories*; and



3. The enclosure opening protectives above the *horizontal assembly* have a *fire protection rating* of not less than 1 hour.
4. The building or buildings above the *horizontal assembly* shall be permitted to have multiple Group A occupancy uses, each with an *occupant load* of less than 300, or Group B, M, R or S occupancies.
5. The building below the *horizontal assembly* shall be protected throughout by an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and shall be permitted to be any occupancy allowed by this code except Group H.
6. The maximum *building height* in feet (mm) shall not exceed the limits set forth in Section 504.3 for the building having the smaller allowable height as measured from the *grade plane*.

**510.3 Group S-2 enclosed parking garage with Group S-2 open parking garage above.**

A Group S-2 enclosed parking garage with not more than one *story* above *grade plane* and located below a Group S-2 *open parking garage* shall be classified as a separate and distinct building for the purpose of determining the type of construction where all of the following conditions are met:

1. The allowable area of the building shall be such that the sum of the ratios of the actual area divided by the allowable area for each separate occupancy shall not exceed 1.
2. The Group S-2 enclosed parking garage is of Type I or II construction and is at least equal to the *fire-resistance* requirements of the Group S-2 *open parking garage*.
3. The height and the number of tiers of the Group S-2 *open parking garage* shall be limited as specified in Table 406.5.4.
4. The floor assembly separating the Group S-2 enclosed parking garage and Group S-2 *open parking garages* shall be protected as required for the floor assembly of the Group S-2 enclosed parking garage. Openings between the Group S-2 enclosed parking garage and Group S-2 *open parking garage*, except *exit* openings, shall not be required to be protected.

5. The Group S-2 enclosed parking garage is used exclusively for the parking or storage of private motor vehicles, but shall be permitted to contain an office, waiting room and toilet room having a total area of not more than 1,000 square feet (93 m<sup>2</sup>) and mechanical equipment rooms incidental to the operation of the building.

#### **510.4 Parking beneath Group R.**

Where a maximum one *story above grade plane* Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of *stories* to be used in determining the minimum type of construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide *afireresistance rating* not less than the mixed occupancy separation required in Section 508.4.

#### **510.5 Group R-1 and R-2 buildings of Type IIIA construction.**

The height limitation for buildings of Type IIIA construction in Groups R-1 and R-2 shall be increased to six *stories* and 75 feet (22 860 mm) where the first floor assembly above the *basement* has a *fire-resistance rating* of not less than 3 hours and the floor area is subdivided by 2-hour fireresistance-rated *fire walls* into areas of not more than 3,000 square feet (279 m<sup>2</sup>).

#### **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 1½ hours.

#### **510.7 Open parking garage beneath Groups A, I, B, M and R.**

*Open parking garages* constructed under Groups A, I, B, M and R shall not exceed the height and area limitations permitted under Section 406.5. The height and area of the portion of the building above the *open parking garage* shall not exceed the limitations in Section 503 for the upper occupancy. The height, in both feet and *stories*, of the portion of the building above the *open parking garage* shall be measured from *grade plane* and shall include both the *open parking garage* and the portion of the building above the

parking garage.

#### **510.7.1 Fire separation.**

*Fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711 between the parking occupancy and the upper occupancy shall correspond to the required *fire-resistance rating* prescribed in Table 508.4 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. *Means of egress* for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by *fire barriers* having not less than a 2-hour *fire-resistance rating* as required by Section 707 with *self-closing* doors complying with Section 716 or *horizontal assemblies* having not less than a 2-hour *fire-resistance rating* as required by Section 711, with *self-closing* doors complying with Section 716. *Means of egress* from the *open parking garage* shall comply with Section 406.5.

#### **510.8 Group B or M buildings with Group S-2 open parking garage above.**

Group B or M occupancies located below a Group S-2 open parking garage of a lesser type of construction shall be considered as a separate and distinct building from the Group S-2 open parking garage for the purpose of determining the type of construction where all of the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the building below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The building below the horizontal assembly is of Type IA construction.

**Exception:** The building below the *horizontal assembly* shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the building

below is not greater than one story in height above grade plane.

5. The height and area of the building below the *horizontal assembly* does not exceed the limits set forth in Section 503.

6. The height and area of the Group S-2 *open parking garage* does not exceed the limits set forth in Section 406.5. The height, in both feet and *stories*, of the Group S-2 *open parking garage* shall be measured from *grade plane* and shall include the building below the *horizontal assembly*.

7. *Exits* serving the Group S-2 *open parking garage* discharge directly to a street or *public way* and are separated from the building below the *horizontal assembly* by 2-hour *fire barriers* constructed in accordance with Section 707 or 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

#### **510.9 Multiple buildings above a horizontal assembly.**

Where two or more buildings are provided above the *horizontal assembly* separating a Group S-2 parking garage or building below from the buildings above in accordance with the special provisions in Section 510.2, 510.3 or 510.8, the buildings above the *horizontal assembly* shall be regarded as separate and distinct buildings from each other and shall comply with all other provisions of this code as applicable to each separate and distinct building.

## CHAPTER 6 TYPES OF CONSTRUCTION

### SECTION 601 GENERAL

**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	HT	A	B
Primary structural frame <sup>f</sup> (see Section 202)	3 <sup>a</sup>	2 <sup>a</sup>	1	0	1	0	HT	1	0
Bearing walls									
Exterior <sup>e,†</sup>	3	2	1	0	2	2	2	1	0
Interior	3 <sup>a</sup>	2 <sup>a</sup>	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions	See Table 602								
Exterior									
Nonbearing walls and partitions	See Section 602.4.6								
Interior <sup>d</sup>									
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	1 1/2 <sup>b</sup>	1 <sup>b,c</sup>	1 <sup>b,c</sup>	0 <sup>c</sup>	1 <sup>b,c</sup>	0	HT	1 <sup>b,c</sup>	0

For SI: 1 foot = 304.8 mm.

- Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
- Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
- In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
- Not less than the fire-resistance rating required by other sections of this code.
- Not less than the fire-resistance rating based on fire separation distance (see Table 602).
- Not less than the fire-resistance rating as referenced in Section 704.10.

#### 601.1 Scope.

The provisions of this chapter shall control the classification of buildings as to type of construction.

### SECTION 602 CONSTRUCTION CLASSIFICATION

**TABLE 602 FIRE-RESISTANCE RATING REQUIREMENTS FOR**

## EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE<sup>a, d, g</sup>

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H <sup>e</sup>	OCCUPANCY GROUP F-1, M, S-1 <sup>f</sup>	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2, U <sup>h</sup>
$X < 5^b$	All	3	2	1
$5 \leq X < 10$	IA	3	2	1
	Others	2	1	1
$10 \leq X < 30$	IA, IB	2	1	1 <sup>c</sup>
	IIB, VB	1	0	0
	Others	1	1	1 <sup>c</sup>
$X \geq 30$	All	0	0	0

For SI: 1 foot = 304.8 mm.

- a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.
- b. See Section 706.1.1 for party walls.
- c. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.
- d. The fire-resistance rating of an exterior wall is determined based upon the fire separation distance of the exterior wall and the story in which the wall is located.
- e. For special requirements for Group H occupancies, see Section 415.6.
- f. For special requirements for Group S aircraft hangars, see Section 412.4.1.
- g. Where Table 705.8 permits nonbearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.
- h. For a building containing only a Group U occupancy private garage or carport, the exterior wall shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet (1523 mm) or greater.

### 602.1 General.

Buildings and structures erected or to be erected, altered or extended in height or area shall be classified in one of the five construction types defined in Sections 602.2 through 602.5. The building elements shall have a *fire-resistance rating* not less than that specified in Table 601 and exterior walls shall have a *fire-resistance rating* not less than that specified in Table 602. Where required to have a *fire-resistance rating* by Table 601, building elements shall comply with the applicable provisions of Section 703.2. The protection of openings, ducts and air transfer openings in building elements shall not be required unless required by other provisions of this code.

#### 602.1.1 Minimum requirements.

A building or portion thereof shall not be required to conform to the details of a type of construction higher than that type which meets the minimum requirements based on occupancy even though certain features of such a building actually conform to a higher type of construction.

## 602.2 Types I and II.

Types I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials, except as permitted in Section 603 and elsewhere in this code.

## 602.3 Type III.

Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within *exterior wall* assemblies of a 2-hour rating or less.

## 602.4 Type IV.

Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.1 or 602.4.2 shall be permitted. Minimum solid sawn nominal dimensions are required for structures built using Type IV construction (HT). For gluedlaminated members and structural composite lumber (SCL) members, the equivalent net finished width and depths corresponding to the minimum nominal width and depths of solid sawn lumber are required as specified in Table 602.4. *Crosslaminated timber* (CLT) dimensions used in this section are actual dimensions.

**TABLE 602.4 WOOD MEMBER SIZE EQUIVALENCIES**

MINIMUM NOMINAL SOLID SAWN SIZE		MINIMUM GLUED- LAMINATED NET SIZE		MINIMUM STRUCTURAL COMPOSITE LUMBER NET SIZE	
Width, inch	Depth, inch	Width, inch	Depth, inch	Width, inch	Depth, inch
8	8	6 <sup>3</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>4</sub>	7	7 <sup>1</sup> / <sub>2</sub>
6	10	5	10 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>
6	8	5	8 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>
6	6	5	6	5 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>2</sub>
4	6	3	6 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>

For SI: 1 inch = 25.4 mm.

### 602.4.1 Fire-retardant-treated wood in exterior walls.

*Fire-retardant-treated wood* framing complying with Section 2303.2 shall be

permitted within exterior wall assemblies with a 2-hour rating or less.

#### **602.4.2 Cross-laminated timber in exterior walls.**

*Cross-laminated timber* complying with Section 2303.1.4 shall be permitted within exterior wall assemblies with a 2-hour rating or less, provided the exterior surface of the cross-laminated timber is protected by one the following:

1. *Fire-retardant-treated wood* sheathing complying with Section 2303.2 and not less than  $\frac{15}{32}$  inch (12 mm) thick;
2. *Gypsum board* not less than  $\frac{1}{2}$  inch (12.7 mm) thick; or
3. A noncombustible material.

#### **602.4.3 Columns.**

Wood columns shall be sawn or glued laminated and shall be not less than 8 inches (203 mm), nominal, in any dimension where supporting floor loads and not less than 6 inches (152 mm) nominal in width and not less than 8 inches (203 mm) nominal in depth where supporting roof and ceiling loads only. Columns shall be continuous or superimposed and connected in an *approved* manner. Protection in accordance with Section 704.2 is not required.

#### **602.4.4 Floor framing.**

Wood beams and girders shall be of sawn or glued-laminated timber and shall be not less than 6 inches (152 mm) nominal in width and not less than 10 inches (254 mm) nominal in depth. Framed sawn or glued-laminated timber arches, which spring from the floor line and support floor loads, shall be not less than 8 inches (203 mm) nominal in any dimension. Framed timber trusses supporting floor loads shall have members of not less than 8 inches (203 mm) nominal in any dimension.

#### **602.4.5 Roof framing.**

Wood-frame or glued-laminated arches for roof construction, which spring from the floor line or from grade and do not support floor loads, shall have members not less than 6 inches (152 mm) nominal in width and have not less than 8 inches (203 mm) nominal in depth for the lower half of the height and not less than 6 inches (152 mm) nominal in depth for the upper half. Framed or glued-laminated arches for roof construction that spring from the top of walls or wall abutments, framed timber trusses and other roof framing, which



do not support floor loads, shall have members not less than 4 inches (102 mm) nominal in width and not less than 6 inches (152 mm) nominal in depth. Spaced members shall be permitted to be composed of two or more pieces not less than 3 inches (76 mm) nominal in thickness where blocked solidly throughout their intervening spaces or where spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) nominal in thickness secured to the underside of the members. Splice plates shall be not less than 3 inches (76 mm) nominal in thickness. Where protected by *approved* automatic sprinklers under the roof deck, framing members shall be not less than 3 inches (76 mm) nominal in width.

#### **602.4.6 Floors.**

Floors shall be without concealed spaces. Wood floors shall be constructed in accordance with Section 602.4.6.1 or 602.4.6.2.

##### **602.4.6.1 Sawn or glued-laminated plank floors.**

Sawn or glued-laminated plank floors shall be one of the following:

1. Sawn or glued-laminated planks, splined or tongue-and-groove, of not less than 3 inches (76 mm) nominal in thickness covered with 1-inch (25 mm) nominal dimension tongue-and-groove flooring, laid crosswise or diagonally,  $\frac{15}{32}$ -inch (12 mm) wood structural panel or  $\frac{1}{2}$ -inch (12.7 mm) particleboard.
2. Planks not less than 4 inches (102 mm) nominal in width set on edge close together and well spiked and covered with 1-inch (25 mm) nominal dimension flooring or  $\frac{15}{32}$ -inch (12 mm) wood structural panel or  $\frac{1}{2}$ -inch (12.7 mm) particleboard.

The lumber shall be laid so that no continuous line of joints will occur except at points of support. Floors shall not extend closer than  $\frac{1}{2}$  inch (12.7 mm) to walls. Such  $\frac{1}{2}$ -inch (12.7 mm) space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinkage movements of the floor. Corbelling of masonry walls under the floor shall be permitted to be used in place of molding.

##### **602.4.6.2 Cross-laminated timber floors.**

*Cross-laminated timber* shall be not less than 4 inches (102 mm) in thickness. *Cross-laminated timber* shall be continuous from support to support and mechanically fastened to one another. *Cross-laminated timber* shall be permitted to be connected to walls without a shrinkage gap providing swelling

or shrinking is considered in the design. Corbelling of masonry walls under the floor shall be permitted to be used.

#### **602.4.7 Roofs.**

Roofs shall be without concealed spaces and wood roof decks shall be sawn or glued laminated, splined or tongue-and-groove plank, not less than 2 inches (51 mm) nominal in thickness; 1<sup>1</sup>/<sub>8</sub>-inch-thick (32 mm) wood structural panel (exterior glue); planks not less than 3 inches (76 mm) nominal in width, set on edge close together and laid as required for floors; or of cross-laminated timber. Other types of decking shall be permitted to be used if providing equivalent fire resistance and structural properties.

Cross-laminated timber roofs shall be not less than 3 inches (76 mm) nominal in thickness and shall be continuous from support to support and mechanically fastened to one another.

#### **602.4.8 Partitions and walls.**

Partitions and walls shall comply with Section 602.4.8.1 or 602.4.8.2.

##### **602.4.8.1 Interior walls and partitions.**

Interior walls and partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction 4 inches (102 mm) thick, or of 1-hour fire-resistance-rated construction.

##### **602.4.8.2 Exterior walls.**

Exterior walls shall be of one of the following:

1. Noncombustible materials.
2. Not less than 6 inches (152 mm) in thickness and constructed of one of the following:
  - 2.1. *Fire-retardant-treated wood* in accordance with Section 2303.2 and complying with Section 602.4.1.
  - 2.2. *Cross-laminated timber* complying with Section 602.4.2.

#### **602.4.9 Exterior structural members.**

Where a horizontal separation of 20 feet (6096 mm) or more is provided, wood columns and arches conforming to heavy timber sizes shall be

permitted to be used externally.

### **602.5 Type V.**

Type V construction is that type of construction in which the structural elements, *exterior walls* and interior walls are of any materials permitted by this code.

## **SECTION 603 COMBUSTIBLE MATERIAL IN TYPES I AND II CONSTRUCTION**

### **603.1 Allowable materials.**

Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. *Fire-retardant-treated wood* shall be permitted in:

1.1. Nonbearing partitions where the required *fireresistance rating* is 2 hours or less.

1.2. Nonbearing *exterior walls* where fire-resistance-rated construction is not required.

1.3. Roof construction, including girders, trusses, framing and decking.

**Exception:** In buildings of Type IA construction exceeding two *stories above grade plane*, *fire-retardant-treated wood* is not permitted in roof construction where the vertical distance from the upper floor to the roof is less than 20 feet (6096 mm).

2. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than 25.

### **Exceptions:**

1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a *flame spread index* of not more than 100.

2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a *flame spread index* of not

more than 200.

3. Foam plastics in accordance with Chapter 26.

4. Roof coverings that have an A, B or C classification.

5. *Interior floor finish* and floor covering materials installed in accordance with Section 804.

6. Millwork such as doors, door frames, window sashes and frames.

7. *Interior wall and ceiling finishes* installed in accordance with Sections 801 and 803.

8. *Trim* installed in accordance with Section 806.

9. Where not installed greater than 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.

10. Finish flooring installed in accordance with Section 805.

11. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a *corridor* serving an *occupant load* of 30 or more shall be permitted to be constructed of *fire-retardant-treated wood*, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.

12. Stages and platforms constructed in accordance with Sections 410.3 and 410.4, respectively.

13. Combustible *exterior wall coverings*, balconies and similar projections and bay or oriel windows in accordance with Chapter 14.

14. Blocking such as for handrails, millwork, cabinets and window and door frames.

15. Light-transmitting plastics as permitted by Chapter 26.

16. Mastics and caulking materials applied to provide flexible seals between components of *exterior wall* construction.

17. Exterior plastic veneer installed in accordance with Section 2605.2.
18. Nailing or furring strips as permitted by Section 803.13.
19. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.7 and 1406.3.
20. Aggregates, component materials and admixtures as permitted by Section 703.2.2.
21. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of *fire resistance* tests in accordance with Section 703.2 and installed in accordance with Sections 1705.14 and 1705.15, respectively.
22. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials used to protect joints in fire-resistance-rated assemblies in accordance with Section 715.
24. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 718.5.
25. Materials exposed within plenums complying with Section 602 of the *International Mechanical Code*.
26. Wall construction of freezers and coolers of less than 1,000 square feet (92.9 m<sup>2</sup>), in size, lined on both sides with noncombustible materials and the building is protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

#### **603.1.1 Ducts.**

The use of nonmetallic ducts shall be permitted where installed in accordance with the limitations of the *International Mechanical Code*.

#### **603.1.2 Piping.**

The use of combustible piping materials shall be permitted where installed in accordance with the limitations of the *International Mechanical Code* and the *International Plumbing Code*.

**603.1.3 Electrical.**

The use of electrical wiring methods with combustible insulation, tubing, raceways and related components shall be permitted where installed in accordance with the limitations of this code.

## CHAPTER 10 MEANS OF EGRESS

*User note: Code change proposals to sections preceded by the designation [F] will be considered by the International Fire Code Development Committee during the 2016 (Group B) Code Development Cycle. See explanation on page iv.*

### SECTION 1001 ADMINISTRATION

#### **1001.1 General.**

Buildings or portions thereof shall be provided with a *means of egress* system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of *means of egress* components required to provide an *approved means of egress* from structures and portions thereof.

#### **1001.2 Minimum requirements.**

It shall be unlawful to alter a building or structure in a manner that will reduce the number of *exits* or the minimum width or required capacity of the *means of egress* to less than required by this code.

#### **[F] 1001.3 Maintenance.**

*Means of egress* shall be maintained in accordance with the *International Fire Code*.

#### **[F] 1001.4 Fire safety and evacuation plans.**

Fire safety and evacuation plans shall be provided for all occupancies and buildings where required by the *International Fire Code*. Such fire safety and evacuation plans shall comply with the applicable provisions of Sections 401.2 and 404 of the *International Fire Code*.

### SECTION 1002 DEFINITIONS

#### **1002.1 Definitions.**

The following terms are defined in Chapter 2:

**ACCESSIBLE MEANS OF EGRESS.**

**AISLE.**

**AISLE ACCESSWAY.**

**ALTERNATING TREAD DEVICE.**

**AREA OF REFUGE.**

**BLEACHERS.**

**BREAKOUT.**

**COMMON PATH OF EGRESS TRAVEL.**

**CORRIDOR.**

**DOOR, BALANCED.**

**EGRESS COURT.**

**EMERGENCY ESCAPE AND RESCUE OPENING.**

**EXIT.**

**EXIT ACCESS.**

**EXIT ACCESS DOORWAY.**

**EXIT ACCESS RAMP.**

**EXIT ACCESS STAIRWAY.**

**EXIT DISCHARGE.**

**EXIT DISCHARGE, LEVEL OF.**

**EXIT, HORIZONTAL.**

**EXIT PASSAGEWAY.**

**EXTERIOR EXIT RAMP.**

**EXTERIOR EXIT STAIRWAY.**

**FIRE EXIT HARDWARE.**

**FIXED SEATING.**

**FLIGHT.**

**FLOOR AREA, GROSS.**

**FLOOR AREA, NET.**

**FOLDING AND TELESCOPIC SEATING.**



**GRANDSTAND.**

**GUARD.**

**HANDRAIL.**

**INTERIOR EXIT RAMP.**

**INTERIOR EXIT STAIRWAY.**

**LOW ENERGY POWER-OPERATED DOOR.**

**MEANS OF EGRESS.**

**MERCHANDISE PAD.**

**NOSING.**

**OCCUPANT LOAD.**

**OPEN-ENDED CORRIDOR.**

**PANIC HARDWARE.**

**PHOTOLUMINESCENT.**

**POWER-ASSISTED DOOR.**

**POWER-OPERATED DOOR.**

**PUBLIC WAY.**

**RAMP.**

**SCISSOR STAIRWAY.**

**SELF-LUMINOUS.**

**SMOKE-PROTECTED ASSEMBLY SEATING.**

**STAIR.**

**STAIRWAY.**

**STAIRWAY, SPIRAL.**

## **WINDER.**

### **SECTION 1003 GENERAL MEANS OF EGRESS**

#### **1003.1 Applicability.**

The general requirements specified in Sections 1003 through 1015 shall apply to all three elements of the *means of egress* system, in addition to those specific requirements for the *exit access*, the *exit* and the *exit discharge* detailed elsewhere in this chapter.

#### **1003.2 Ceiling height.**

The *means of egress* shall have a ceiling height of not less than 7 feet 6 inches (2286 mm).

#### **Exceptions:**

1. Sloped ceilings in accordance with Section 1208.2.
2. Ceilings of *dwelling units* and *sleeping units* within residential occupancies in accordance with Section 1208.2.
3. Allowable projections in accordance with Section 1003.3.
4. *Stair* headroom in accordance with Section 1011.3.
5. Door height in accordance with Section 1010.1.1.
6. *Ramp* headroom in accordance with Section 1012.5.2.
7. The clear height of floor levels in vehicular and pedestrian traffic areas of public and private parking garages in accordance with Section 406.4.1.
8. Areas above and below *mezzanine* floors in accordance with Section 505.2.

#### **1003.3 Protruding objects.**

Protruding objects on *circulation paths* shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.

##### **1003.3.1 Headroom.**

Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any walking surface, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a *means of egress* shall be reduced in height by protruding objects.

**Exception:** Door closers and stops shall not reduce headroom to less than 78 inches

(1981 mm).

A barrier shall be provided where the vertical clearance is less than 80 inches (2032 mm) high. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the floor.

#### **1003.3.2 Post-mounted objects.**

A free-standing object mounted on a post or pylon shall not overhang that post or pylon more than 4 inches (102 mm) where the lowest point of the leading edge is more than 27 inches (686 mm) and less than 80 inches (2032 mm) above the walking surface. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (686 mm) maximum or 80 inches (2032 mm) minimum above the finished floor or ground.

**Exception:** These requirements shall not apply to sloping portions of *handrails* between the top and bottom riser of *stairs* and above the *ramp* run.

#### **1003.3.3 Horizontal projections.**

Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the floor shall not project horizontally more than 4 inches (102 mm) into the *circulation path*.

**Exception:** *Handrails* are permitted to protrude 4<sup>1</sup>/<sub>2</sub> inches (114 mm) from the wall.

#### **1003.3.4 Clear width.**

Protruding objects shall not reduce the minimum clear width of *accessible routes*.

#### **1003.4 Floor surface.**

Walking surfaces of the *means of egress* shall have a slip-resistant surface and be securely attached.

#### **1003.5 Elevation change.**

Where changes in elevation of less than 12 inches (305 mm) exist in the *means of egress*, sloped surfaces shall be used. Where the slope is greater than one unit vertical in 20 units horizontal (5-percent slope), *ramps* complying with Section 1012 shall be used. Where the difference in elevation is 6 inches (152 mm) or less, the *ramp* shall be equipped with either *handrails* or floor finish materials that contrast with adjacent floor finish materials.

#### **Exceptions:**

1. A single step with a maximum riser height of 7 inches (178 mm) is permitted for buildings with occupancies in Groups F, H, R-2, R-3, S and U at exterior doors not required to be *accessible* by Chapter 11.

2. A *stair* with a single riser or with two risers and a tread is permitted at locations not required to be *accessible* by Chapter 11 where the risers and treads comply with Section 1011.5, the minimum depth of the tread is 13 inches (330 mm) and not less than one *handrail* complying with Section 1014 is provided within 30 inches (762 mm) of the centerline of the normal path of egress travel on the *stair*.

3. A step is permitted in *aisles* serving seating that has a difference in elevation less than 12 inches (305 mm) at locations not required to be *accessible* by Chapter 11, provided that the risers and treads comply with Section 1029.13 and the *aisle* is provided with a *handrail* complying with Section 1029.15.

Throughout a story in a Group I-2 occupancy, any change in elevation in portions of the *means of egress* that serve nonambulatory persons shall be by means of a *ramp* or sloped walkway.

### **1003.6 Means of egress continuity.**

The path of egress travel along a *means of egress* shall not be interrupted by a building element other than a *means of egress* component as specified in this chapter. Obstructions shall not be placed in the minimum width or required capacity of a *means of egress* component except projections permitted by this chapter. The minimum width or required capacity of a *means of egress* system shall not be diminished along the path of egress travel.

### **1003.7 Elevators, escalators and moving walks.**

Elevators, escalators and moving walks shall not be used as a component of a required *means of egress* from any other part of the building.

**Exception:** Elevators used as an accessible *means of egress* in accordance with Section 1009.4.

## **SECTION 1004 OCCUPANT LOAD**

### **1004.1 Design occupant load.**

In determining *means of egress* requirements, the number of occupants for whom *means of egress* facilities are provided shall be determined in accordance with this section.

#### **1004.1.1 Cumulative occupant loads.**

Where the path of egress travel includes intervening rooms, areas or spaces, cumulative *occupant loads* shall be determined in accordance with this section.

##### **1004.1.1.1 Intervening spaces or accessory areas.**

Where occupants egress from one or more rooms, areas or spaces through others, the design *occupant load* shall be the combined *occupant load* of interconnected accessory or intervening spaces. Design of egress path capacity shall be based on the cumulative portion of *occupant loads* of all rooms, areas or spaces to that point along the path of

egress travel.

#### **1004.1.1.2 Adjacent levels for mezzanines.**

That portion of the *occupant load* of a *mezzanine* with required egress through a room, area or space on an adjacent level shall be added to the *occupant load* of that room, area or space.

#### **1004.1.1.3 Adjacent stories.**

Other than for the egress components designed for convergence in accordance with Section 1005.6, the *occupant load* from separate stories shall not be added.

#### **1004.1.2 Areas without fixed seating.**

The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 1004.1.2. For areas without *fixed seating*, the occupant load shall be not less than that number determined by dividing the floor area under consideration by the *occupant load* factor assigned to the function of the space as set forth in Table 1004.1.2. Where an intended function is not listed in Table 1004.1.2, the *building official* shall establish a function based on a listed function that most nearly resembles the intended function.

**Exception:** Where *approved* by the *building official*, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by calculation, shall be permitted to be used in the determination of the design *occupant load*.

**TABLE 1004.1.2 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT**

<b>FUNCTION OF SPACE</b>	<b>OCCUPANT LOAD FACTOR<sup>a</sup></b>
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 1004.4
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	100 gross
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 square foot = 0.0929 m<sup>2</sup>, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

#### **1004.2 Increased occupant load.**

The *occupant load* permitted in any building, or portion thereof, is permitted to be increased from that number established for the occupancies in Table 1004.1.2, provided that all other requirements of the code are met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m<sup>2</sup>) of occupiable floor space. Where required by the *building official*, an *approved aisle*, seating or fixed equipment diagram substantiating any increase in *occupant load* shall

be submitted. Where required by the *building official*, such diagram shall be posted.

#### **1004.3 Posting of occupant load.**

Every room or space that is an assembly occupancy shall have the *occupant load* of the room or space posted in a conspicuous place, near the main *exit* or *exit access doorway* from the room or space. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or the owner's authorized agent.

#### **1004.4 Fixed seating.**

For areas having *fixed seats* and *aisles*, the *occupant load* shall be determined by the number of *fixed seats* installed therein. The *occupant load* for areas in which *fixed seating* is not installed, such as waiting spaces, shall be determined in accordance with Section 1004.1.2 and added to the number of *fixed seats*.

The *occupant load* of *wheelchair spaces* and the associated companion seat shall be based on one occupant for each *wheelchair space* and one occupant for the associated companion seat provided in accordance with Section 1108.2.3.

For areas having *fixed seating* without dividing arms, the *occupant load* shall be not less than the number of seats based on one person for each 18 inches (457 mm) of seating length.

The *occupant load* of seating booths shall be based on one person for each 24 inches (610 mm) of booth seat length measured at the backrest of the seating booth.

#### **1004.5 Outdoor areas.**

*Yards*, *patios*, *courts* and similar outdoor areas accessible to and usable by the building occupants shall be provided with *means of egress* as required by this chapter.

The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by persons in addition to the occupants of the building, and the path of egress travel from the outdoor areas passes through the building, *means of egress* requirements for the building shall be based on the sum of the *occupant loads* of the building plus the outdoor areas.

#### **Exceptions:**

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual dwelling units of Group R-2.

#### **1004.6 Multiple occupancies.**

Where a building contains two or more occupancies, the *means of egress* requirements shall apply to each portion of the building based on the occupancy of that space. Where

two or more occupancies utilize portions of the same *means of egress* system, those egress components shall meet the more stringent requirements of all occupancies that are served.

## **SECTION 1005 MEANS OF EGRESS SIZING**

### **1005.1 General.**

All portions of the *means of egress* system shall be sized in accordance with this section.

**Exception:** *Aisles* and *aisle accessways* in rooms or spaces used for assembly purposes complying with Section 1029.

### **1005.2 Minimum width based on component.**

The minimum width, in inches (mm), of any *means of egress* components shall be not less than that specified for such component, elsewhere in this code.

### **1005.3 Required capacity based on occupant load.**

The required capacity, in inches (mm), of the *means of egress* for any room, area, space or story shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2:

#### **1005.3.1 Stairways.**

The capacity, in inches, of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a means of egress capacity factor of 0.3 inch (7.6 mm) per occupant. Where *stairways* serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the *stairways* serving that story.

#### **Exceptions:**

1. For other than Group H and I-2 occupancies, the capacity, in inches, of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an *emergency voice/alarm communication* system in accordance with Section 907.5.2.2.

2. Facilities with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1029.6.2 indicated for stepped aisles for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.

3. Facilities with outdoor *smoke-protected assembly seating* shall be permitted to the capacity factors in Section 1029.6.3 indicated for stepped aisles for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit*



*discharge* is open to the outdoors.

### **1005.3.2 Other egress components.**

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 inch (5.1 mm) per occupant.

#### **Exceptions:**

1. For other than Group H and I-2 occupancies, 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 0.15 inch (3.8 mm) per occupant in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an *emergency voice/alarm communication* system in accordance with Section 907.5.2.2.

2. Facilities with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1029.6.2 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.

3. Facilities with outdoor *smoke-protected assembly* seating shall be permitted to the capacity factors in Section 1029.6.3 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

### **1005.4 Continuity.**

The minimum width or required capacity of the *means of egress* required from any story of a building shall not be reduced along the path of egress travel until arrival at the public way.

### **1005.5 Distribution of minimum width and required capacity.**

Where more than one *exit*, or access to more than one *exit*, is required, the *means of egress* shall be configured such that the loss of any one *exit*, or access to one *exit*, shall not reduce the available capacity or width to less than 50 percent of the required capacity or width.

### **1005.6 Egress convergence.**

Where the *means of egress* from stories above and below converge at an intermediate level, the capacity of the *means of egress* from the point of convergence shall be not less than the largest minimum width or the sum of the required capacities for the *stairways* or *ramps* serving the two adjacent stories, whichever is larger.

### **1005.7 Encroachment.**

Encroachments into the required *means of egress* width shall be in accordance with the

provisions of this section.

#### **1005.7.1 Doors.**

Doors, when fully opened, shall not reduce the required width by more than 7 inches (178 mm). Doors in any position shall not reduce the required width by more than one-half.

#### **Exceptions:**

1. Surface-mounted latch release hardware shall be exempt from inclusion in the 7-inch maximum (178 mm) encroachment where both of the following conditions exist:

1.1. The hardware is mounted to the side of the door facing away from the adjacent wall where the door is in the open position.

1.2. The hardware is mounted not less than 34 inches (865 mm) nor more than 48 inches (1219 mm) above the finished floor.

2. The restrictions on door swing shall not apply to doors within individual *dwelling units* and *sleeping units* of Group R-2 occupancies and *dwelling units* of Group R-3 occupancies.

#### **1005.7.2 Other projections.**

*Handrail* projections shall be in accordance with the provisions of Section 1014.8. Other nonstructural projections such as trim and similar decorative features shall be permitted to project into the required width not more than 1<sup>1</sup>/<sub>2</sub> inches (38 mm) on each side.

**Exception:** Projections are permitted in corridors within Group I-2 Condition 1 in accordance with Section 407.4.3.

#### **1005.7.3 Protruding objects.**

Protruding objects shall comply with the applicable requirements of Section 1003.3.

### **SECTION 1006 NUMBER OF EXITS AND EXIT ACCESS DOORWAYS**

#### **1006.1 General.**

The number of *exits* or *exit access doorways* required within the *means of egress* system shall comply with the provisions of Section 1006.2 for spaces, including *mezzanines*, and Section 1006.3 for *stories*.

#### **1006.2 Egress from spaces.**

Rooms, areas or spaces, including *mezzanines*, within a *story* or *basement* shall be provided with the number of *exits* or access to *exits* in accordance with this section.

##### **1006.2.1 Egress based on occupant load and common path of egress travel distance.**

Two *exits* or *exit access doorways* from any space shall be provided where the design *occupant load* or the *common path of egress travel* distance exceeds the values listed in Table 1006.2.1.

### Exceptions:

1. In Group R-2 and R-3 occupancies, one *means of egress* is permitted within and from individual *dwelling units* with a maximum *occupant load* of 20 where the *dwelling unit* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and the *common path of egress travel* does not exceed 125 feet (38 100 mm).

2. *Care suites* in Group I-2 occupancies complying with Section 407.4.

**TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY**

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

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where *automatic sprinkler systems* are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having *fixed seating*, see Section 1029.8.

d. For the travel distance limitations in Group I-2, see Section 407.4.

- e. The length of *common path of egress travel* distance in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 *congregate living facility*.
- f. The length of *common path of egress travel* distance in a Group S-2 *open parking garage* shall be not more than 100 feet.

#### **1006.2.1.1 Three or more exits or exit access doorways.**

Three *exits* or *exit access doorways* shall be provided from any space with an occupant load of 501 to 1,000. Four *exits* or *exit access doorways* shall be provided from any space with an occupant load greater than 1,000.

#### **1006.2.2 Egress based on use.**

The numbers of *exits* or access to *exits* shall be provided in the uses described in Sections 1006.2.2.1 through 1006.2.2.5.

##### **1006.2.2.1 Boiler, incinerator and furnace rooms.**

Two *exit access doorways* are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m<sup>2</sup>) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two *exit access doorways* are required, one is permitted to be a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

##### **1006.2.2.2 Refrigeration machinery rooms.**

Machinery rooms larger than 1,000 square feet (93 m<sup>2</sup>) shall have not less than two *exits* or *exit access doorways*. Where two *exit access doorways* are required, one such doorway is permitted to be served by a fixed ladder or an *alternating tread device*. *Exit access doorways* shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room.

All portions of machinery rooms shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway*. An increase in *exit access travel* distance is permitted in accordance with Section 1017.1.

Doors shall swing in the direction of egress travel, regardless of the *occupant load* served. Doors shall be tight fitting and self-closing.

##### **1006.2.2.3 Refrigerated rooms or spaces.**

Rooms or spaces having a floor area larger than 1,000 square feet (93 m<sup>2</sup>), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two *exits* or *exit access doorways*.

*Exit access travel* distance shall be determined as specified in Section 1017.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an *exit* or *exit access doorway* where such rooms are not protected by an approved *automatic sprinkler system*. Egress is allowed through adjoining refrigerated rooms or spaces.

**Exception:** Where using refrigerants in quantities limited to the amounts based on the volume set forth in the *International Mechanical Code*.

#### **1006.2.2.4 Day care means of egress.**

Day care facilities, rooms or spaces where care is provided for more than 10 children that are 2<sup>1</sup>/<sub>2</sub> years of age or less, shall have access to not less than two *exits* or *exit access doorways*.

#### **1006.2.2.5 Vehicular ramps.**

Vehicular ramps shall not be considered as an *exit access ramp* unless pedestrian facilities are provided.

### **1006.3 Egress from stories or occupied roofs.**

The *means of egress* system serving any *story* or occupied roof shall be provided with the number of *exits* or access to *exits* based on the aggregate *occupant load* served in accordance with this section. The *path of egress travel* to an *exit* shall not pass through more than one adjacent *story*.

#### **1006.3.1 Egress based on occupant load.**

Each *story* and occupied roof shall have the minimum number of independent *exits*, or access to *exits*, as specified in Table 1006.3.1. A single *exit* or access to a single *exit* shall be permitted in accordance with Section 1006.3.2. The required number of *exits*, or *exit access stairways* or *ramps* providing access to *exits*, from any *story* or occupied roof shall be maintained until arrival at the *exit discharge* or a *public way*.

**TABLE 1006.3.1 MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY**

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

#### **1006.3.2 Single exits.**

A single *exit* or access to a single *exit* shall be permitted from any *story* or occupied roof where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and common path of egress travel distance does not exceed the values in Table 1006.3.2(1) or 1006.3.2(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

5. Individual single-story or multistory *dwelling units* shall be permitted to have a single exit or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the dwelling unit's entrance door provides access to not less than two approved independent *exits*.

**TABLE 1006.3.2(1) STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES**

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane	R-2 <sup>a, b</sup>	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 3048 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with *emergency escape and rescue openings* in accordance with Section 1030.

b. This table is used for R-2 occupancies consisting of *dwelling units*. For R-2 occupancies consisting of *sleeping units*, use Table 1006.3.2(2).

**1006.3.2(2) STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES**

STORY	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)
	A, B <sup>b</sup> , E F <sup>b</sup> , M, U	49	75

First story above or below grade plane	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2 <sup>a, c</sup> , R-4	10	75
	S <sup>b, d</sup>	29	75
Second story above grade plane	B, F, M, S <sup>d</sup>	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with *emergency escape and rescue openings* in accordance with Section 1030.

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

c. This table is used for R-2 occupancies consisting of *sleeping units*. For R-2 occupancies consisting of *dwelling units*, use Table 1006.3.2(1).

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

### 1006.3.2.1 Mixed occupancies.

Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other *stories*, is permitted to serve individual *stories*, mixed occupancies shall be permitted to be served by single *exits* provided each individual occupancy complies with the applicable requirements of Table 1006.3.2(1) or 1006.3.2(2) for that occupancy.

Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.2(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

## SECTION 1007 EXIT AND EXIT ACCESS DOORWAY CONFIGURATION

### 1007.1 General.

*Exits*, *exit access doorways*, and *exit access stairways* and *ramps* serving spaces, including individual building *stories*, shall be separated in accordance with the provisions of this section.

#### 1007.1.1 Two exits or exit access doorways.

Where two *exits*, *exit access doorways*, *exit access stairways* or *ramps*, or any combination thereof, are required from any portion of the *exit access*, they shall be

placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between them. Interlocking or *scissor stairways* shall be counted as one *exit stairway*.

**Exceptions:**

1. Where interior *exit stairways* or *ramps* are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1020, the required exit separation shall be measured along the shortest direct line of travel within the corridor.

2. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

**1007.1.1.1 Measurement point.**

The separation distance required in Section 1007.1.1 shall be measured in accordance with the following:

1. The separation distance to *exit* or *exit access doorways* shall be measured to any point along the width of the doorway.

2. The separation distance to *exit access stairways* shall be measured to the closest riser.

3. The separation distance to *exit access ramps* shall be measured to the start of the ramp run.

**1007.1.2 Three or more exits or exit access doorways.**

Where access to three or more *exits* is required, not less than two *exit* or *exit access doorways* shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required *exit* or *exit access doorways* shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.

**1007.1.3 Remoteness of exit access stairways or ramps.**

Where two *exit access stairways* or *ramps* provide the required *means of egress* to *exits* at another *story*, the required separation distance shall be maintained for all portions of such *exit access stairways* or *ramps*.

**1007.1.3.1 Three or more exit access stairways or ramps.**

Where more than two *exit access stairways* or *ramps* provide the required *means of egress*, not less than two shall be arranged in accordance with Section 1007.1.3.

**SECTION 1008 MEANS OF EGRESS ILLUMINATION**



**1008.1 Means of egress illumination.**

Illumination shall be provided in the *means of egress* in accordance with Section 1008.2. Under emergency power, means of egress illumination shall comply with Section 1008.3.

**1008.2 Illumination required.**

The *means of egress* serving a room or space shall be illuminated at all times that the room or space is occupied.

**Exceptions:**

1. Occupancies in Group U.
2. *Aisle accessways* in Group A.
3. *Dwelling units* and *sleeping units* in Groups R-1, R- 2 and R-3.
4. *Sleeping units* of Group I occupancies.

**1008.2.1 Illumination level under normal power.**

The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface.

**Exception:** For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' fire alarm system:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of ramps shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems listed in accordance with UL 1994.

**1008.2.2 Exit discharge.**

In Group I-2 occupancies where two or more exits are required, on the exterior landings required by Section 1010.6.1, means of egress illumination levels for the exit discharge shall be provided such that failure of any single lighting unit shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

**1008.3 Emergency power for illumination.**

The power supply for means of egress illumination shall normally be provided by the premises' electrical supply.

**1008.3.1 General.**

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.*
3. *Exit access stairways and ramps.*

#### **1008.3.2 Buildings.**

In the event of power supply failure in buildings that require two or more *means of egress*, an emergency electrical system shall automatically illuminate all of the following areas:

1. *Interior exit access stairways and ramps.*
2. *Interior and exterior exit stairways and ramps.*
3. *Exit passageways.*
4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.1.
5. Exterior landings as required by Section 1010.1.6 for *exit doorways* that lead directly to the *exit discharge*.

#### **1008.3.3 Rooms and spaces.**

In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Electrical equipment rooms.
2. Fire command centers.
3. Fire pump rooms.
4. Generator rooms.
5. Public restrooms with an area greater than 300 square feet (27.87 m<sup>2</sup>).

#### **1008.3.4 Duration.**

The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702.

### **1008.3.5 Illumination level under emergency power.**

Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of any single lighting unit shall not reduce the illumination level to less than 0.2 foot-candle (2.2 lux).

## **SECTION 1009 ACCESSIBLE MEANS OF EGRESS**

### **1009.1 Accessible means of egress required.**

*Accessible means of egress* shall comply with this section. *Accessible* spaces shall be provided with not less than one *accessible means of egress*. Where more than one *means of egress* are required by Section 1006.2 or 1006.3 from any *accessible space*, each *accessible* portion of the space shall be served by not less than two *accessible means of egress*.

#### **Exceptions:**

1. *Accessible means of egress* are not required to be provided in existing buildings.
2. One *accessible means of egress* is required from an *accessible mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.
3. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the *common path of egress travel* is *accessible* and meets the requirements in Section 1029.8.

### **1009.2 Continuity and components.**

Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.

6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving exits at the *level of exit discharge*.

#### **1009.2.1 Elevators required.**

In buildings where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge*, not less than one required *accessible means of egress* shall be an elevator complying with Section 1009.4.

#### **Exceptions:**

1. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a *ramp* conforming to the provisions of Section 1012.

#### **1009.3 Stairways.**

In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall have a clear width of 48 inches (1219 mm) minimum between *handrails* and shall either incorporate an *area of refuge* within an enlarged floor-level landing or shall be accessed from an *area of refuge* complying with Section 1009.6. *Exit access stairways* that connect levels in the same *story* are not permitted as part of an *accessible means of egress*.

#### **Exceptions:**

1. *Exit access stairways* providing *means of egress* from *mezzanines* are permitted as part of an *accessible means of egress*.
2. The clear width of 48 inches (1219 mm) between *handrails* is not required in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. The clear width of 48 inches (1219 mm) between *handrails* is not required for *stairways* accessed from a refuge area in conjunction with a *horizontal exit*.

4. *Areas of refuge* are not required at *exit access stairways* where two-way communication is provided at the elevator landing in accordance with Section 1009.8.

5. *Areas of refuge* are not required at *stairways* in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

6. *Areas of refuge* are not required at *stairways* serving *open parking garages*.

7. *Areas of refuge* are not required for *smoke-protected assembly seating areas* complying with Section 1029.6.2.

8. *Areas of refuge* are not required at *stairways* in Group R-2 occupancies.

9. *Areas of refuge* are not required for *stairways* accessed from a refuge area in conjunction with a *horizontal exit*.

#### **1009.4 Elevators.**

In order to be considered part of an *accessible means of egress*, an elevator shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1/CSA B44. Standby power shall be provided in accordance with Chapter 27 and Section 3003. The elevator shall be accessed from an *area of refuge* complying with Section 1009.6.

#### **Exceptions:**

1. *Areas of refuge* are not required at the elevator in *open parking garages*.

2. *Areas of refuge* are not required in buildings and facilities equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3. *Areas of refuge* are not required at elevators not required to be located in a shaft in accordance with Section 712.

4. *Areas of refuge* are not required at elevators serving *smoke-protected assembly seating areas* complying with Section 1029.6.2.

5. *Areas of refuge* are not required for elevators accessed from a refuge area in conjunction with a *horizontal exit*.

#### **1009.5 Platform lifts.**

Platform lifts shall be permitted to serve as part of an *accessible means of egress* where allowed as part of a required *accessible route* in Section 1109.8 except for Item 10. Standby power for the platform lift shall be provided in accordance with Chapter 27.

**1009.6 Areas of refuge.**

Every required *area of refuge* shall be accessible from the space it serves by an *accessible means of egress*.

**1009.6.1 Travel distance.**

The maximum travel distance from any *accessible* space to an *area of refuge* shall not exceed the *exit access* travel distance permitted for the occupancy in accordance with Section 1017.1.

**1009.6.2 Stairway or elevator access.**

Every required *area of refuge* shall have direct access to a *stairway* complying with Sections 1009.3 and 1023 or an elevator complying with Section 1009.4.

**1009.6.3 Size.**

Each *area of refuge* shall be sized to accommodate one *wheelchair space* of 30 inches by 48 inches (762 mm by 1219 mm) for each 200 occupants or portion thereof, based on the *occupant load* of the *area of refuge* and areas served by the *area of refuge*. Such *wheelchair spaces* shall not reduce the *means of egress* minimum width or required capacity. Access to any of the required *wheelchair spaces* in an *area of refuge* shall not be obstructed by more than one adjoining *wheelchair space*.

**1009.6.4 Separation.**

Each *area of refuge* shall be separated from the remainder of the story by a *smoke barrier* complying with Section 709 or a *horizontal* exit complying with Section 1026. Each *area of refuge* shall be designed to minimize the intrusion of smoke.

**Exceptions:**

1. *Areas of refuge* located within an enclosure for *interior exit stairways* complying with Section 1023.
2. *Areas of refuge* in outdoor facilities where *exit access* is essentially open to the outside.

**1009.6.5 Two-way communication.**

*Areas of refuge* shall be provided with a two-way communication system complying with Sections 1009.8.1 and 1009.8.2.

**1009.7 Exterior areas for assisted rescue.**

Exterior areas for assisted rescue shall be accessed by an *accessible route* from the area served.

Where the *exit discharge* does not include an *accessible route* from an *exit* located on the *level of exit discharge* to a *public way*, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through

1009.7.4.

**1009.7.1 Size.**

Each exterior area for assisted rescue shall be sized to accommodate *wheelchair spaces* in accordance with Section 1009.6.3.

**1009.7.2 Separation.**

Exterior walls separating the exterior area of assisted rescue from the interior of the building shall have a minimum *fire-resistance rating* of 1 hour, rated for exposure to fire from the inside. The fire-resistance-rated exterior wall construction shall extend horizontally 10 feet (3048 mm) beyond the landing on either side of the landing or equivalent fire-resistance-rated construction is permitted to extend out perpendicular to the exterior wall 4 feet (1220 mm) minimum on the side of the landing. The *fire-resistance-rated* construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower. Openings within such *fire-resistance-rated* exterior walls shall be protected in accordance with Section 716.

**1009.7.3 Openness.**

The exterior area for assisted rescue shall be open to the outside air. The sides other than the separation walls shall be not less than 50 percent open, and the open area shall be distributed so as to minimize the accumulation of smoke or toxic gases.

**1009.7.4 Stairways.**

*Stairways* that are part of the *means of egress* for the exterior area for assisted rescue shall provide a clear width of 48 inches (1220 mm) between *handrails*.

**Exception:** The clear width of 48 inches (1220 mm) between *handrails* is not required at *stairways* serving buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

**1009.8 Two-way communication.**

A two-way communication system complying with Sections 1009.8.1 and 1009.8.2 shall be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the *level of exit discharge*.

**Exceptions:**

1. Two-way communication systems are not required at the landing serving each elevator or bank of elevators where the two-way communication system is provided within *areas of refuge* in accordance with Section 1009.6.5.
2. Two-way communication systems are not required on floors provided with *ramps* conforming to the provisions of Section 1012.
3. Two-way communication systems are not required at the landings serving only

service elevators that are not designated as part of the *accessible means of egress* or serve as part of the required *accessible route* into a facility.

4. Two-way communication systems are not required at the landings serving only freight elevators.

5. Two-way communication systems are not required at the landing serving a private residence elevator.

#### **1009.8.1 System requirements.**

Two-way communication systems shall provide communication between each required location and the *fire command center* or a central control point location *approved* by the fire department. Where the central control point is not a *constantly attended location*, a two-way communication system shall have a timed automatic telephone dial-out capability to a monitoring location or 9-1-1. The two-way communication system shall include both audible and visible signals.

#### **1009.8.2 Directions.**

Directions for the use of the two-way communication system, instructions for summoning assistance via the two-way communication system and written identification of the location shall be posted adjacent to the two-way communication system. Signage shall comply with the ICC A117.1 requirements for visual characters.

#### **1009.9 Signage.**

Signage indicating special accessibility provisions shall be provided as shown:

1. Each door providing access to an *area of refuge* from an adjacent floor area shall be identified by a sign stating: AREA OF REFUGE.

2. Each door providing access to an exterior area for assisted rescue shall be identified by a sign stating: EXTERIOR AREA FOR ASSISTED RESCUE.

Signage shall comply with the *ICC A117.1* requirements for visual characters and include the International Symbol of Accessibility. Where exit sign illumination is required by Section 1013.3, the signs shall be illuminated. Additionally, visual characters, raised character and braille signage complying with ICC A117.1 shall be located at each door to an *area of refuge* and exterior area for assisted rescue in accordance with Section 1013.4.

#### **1009.10 Directional signage.**

Directional signage indicating the location of all other *means of egress* and which of those are *accessible means of egress* shall be provided at the following:

1. At *exits* serving a required *accessible* space but not providing an approved *accessible means of egress*.



2. At elevator landings.
3. Within *areas of refuge*.

#### **1009.11 Instructions.**

In *areas of refuge* and exterior areas for assisted rescue, instructions on the use of the area under emergency conditions shall be posted. Signage shall comply with the ICC A117.1 requirements for visual characters. The instructions shall include all of the following:

1. Persons able to use the *exit stairway* do so as soon as possible, unless they are assisting others.
2. Information on planned availability of assistance in the use of *stairs* or supervised operation of elevators and how to summon such assistance.
3. Directions for use of the two-way communication system where provided.

### **SECTION 1010 DOORS, GATES AND TURNSTILES**

#### **1010.1 Doors.**

*Means of egress* doors shall meet the requirements of this section. Doors serving a *means of egress* system shall meet the requirements of this section and Section 1022.2. Doors provided for egress purposes in numbers greater than required by this code shall meet the requirements of this section.

*Means of egress* doors 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.

##### **1010.1.1 Size of doors.**

The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a minimum clear width of 32 inches (813 mm). Clear openings 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). Where this section requires a minimum clear width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 32 inches (813 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. *Means of egress* doors in a Group I-2 occupancy used for the movement of beds shall provide a clear width not less than 41½ inches (1054 mm). The height of door openings shall be not less than 80 inches (2032 mm).

#### **Exceptions:**

1. The minimum and maximum width shall not apply to door openings that are not part

of the required *means of egress* in Group R-2 and R-3 occupancies.

2. Door openings to resident *sleeping units* in Group I-3 occupancies shall have a clear width of not less than 28 inches (711 mm).

3. Door openings to storage closets less than 10 square feet (0.93 m<sup>2</sup>) in area shall not be limited by the minimum width.

4. Width of door leaves in revolving doors that comply with Section 1010.1.4.1 shall not be limited.

5. Door openings within a *dwelling unit* or *sleeping unit* shall be not less than 78 inches (1981 mm) in height.

6. Exterior door openings in *dwelling units* and *sleeping units*, other than the required *exit* door, shall be not less than 76 inches (1930 mm) in height.

7. In other than Group R-1 occupancies, the minimum widths shall not apply to interior egress doors within *adwelling unit* or *sleeping unit* that is not required to be an *Accessible unit*, *Type A unit* or *Type B unit*.

8. Door openings required to be *accessible* within *Type B units* shall have a minimum clear width of 31.75 inches (806 mm).

9. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m<sup>2</sup>) in area shall have a maximum width of 60 inches (1524 mm).

10. In Group R-1 *dwelling units* or *sleeping units* not required to be *Accessible units*, the minimum width shall not apply to doors for showers or saunas.

#### **1010.1.1.1 Projections into clear width.**

There shall not be projections into the required clear width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

**Exception:** Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

#### **1010.1.2 Door swing.**

Egress doors shall be of the pivoted or side-hinged swinging type.

#### **Exceptions:**

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.

2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1010.1.4.1.
6. In other than Group H occupancies, special purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.1.4.3.
7. Power-operated doors in accordance with Section 1010.1.4.2.
8. Doors serving a bathroom within an individual *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 or less.

#### **1010.1.2.1 Direction of swing.**

Pivot or side-hinged swinging 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.

#### **1010.1.3 Door opening force.**

The force for pushing or pulling open interior swinging egress doors, other than fire doors, shall not exceed 5 pounds (22 N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. For other swinging doors, as well as sliding and folding doors, the door latch shall release when subjected to a 15-pound (67 N) force. The door shall be set in motion when subjected to a 30-pound (133 N) force. The door shall swing to a full-open position when subjected to a 15-pound (67 N) force.

#### **1010.1.3.1 Location of applied forces.**

Forces shall be applied to the latch side of the door.

#### **1010.1.4 Special doors.**

Special doors and security grilles shall comply with the requirements of Sections 1010.1.4.1 through 1010.1.4.4.

#### **1010.1.4.1 Revolving doors.**

Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's instructions.

2. Each revolving door shall be capable of *breakout* in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of *stairways* or escalators. A dispersal area shall be provided between the *stairways* or escalators and the revolving doors.
4. The revolutions per minute (rpm) for a revolving door shall not exceed the maximum rpm as specified in BHMA A156.27. Manual revolving doors shall comply with Table 1010.1.4.1(1). Automatic or power-operated revolving doors shall comply with Table 1010.1.4.1(2).
5. An emergency stop switch shall be provided near each entry point of power or automatic operated revolving doors within 48 inches (1220 mm) of the door and between 24 inches (610 mm) and 48 inches (1220 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.
6. Each revolving door shall have a side-hinged swinging door that complies with Section 1010.1 in the same wall and within 10 feet (3048 mm) of the revolving door.
7. Revolving doors shall not be part of an *accessible route* required by Section 1009 and Chapter 11.

**TABLE 1010.1.4.1(1) MAXIMUM DOOR SPEED MANUAL REVOLVING DOORS**

REVOLVING DOOR MAXIMUM NOMINAL DIAMETER (FT-IN)	MAXIMUM ALLOWABLE REVOLVING DOOR SPEED (RPM)
6-0	12
7-0	11
8-0	10
9-0	9
10-0	8

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

**TABLE 1010.1.4.1(2) MAXIMUM DOOR SPEED AUTOMATIC OR POWER-OPERATED REVOLVING DOORS**

REVOLVING DOOR MAXIMUM NOMINAL DIAMETER (FT-IN)	MAXIMUM ALLOWABLE REVOLVING DOOR SPEED (RPM)
8-0	7.2
9-0	6.4
10-0	5.7
11-0	5.2

12-0	4.8
12-6	4.6
14-0	4.1
16-0	3.6
17-0	3.4
18-0	3.2
20-0	2.9
24-0	2.4

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

#### **1010.1.4.1.1 Egress component.**

A revolving door used as a component of a *means of egress* shall comply with Section 1010.1.4.1 and the following three conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the minimum width or required capacity.
2. Each revolving door shall be credited with a capacity based on not more than a 50-person *occupant load*.
3. Each revolving door shall provide for egress in accordance with BHMA A156.27 with a *breakout* force of not more than 130 pounds (578 N).

#### **1010.1.4.1.2 Other than egress component.**

A revolving door used as other than a component of a *means of egress* shall comply with Section 1010.1.4.1. The *breakout* force of a revolving door not used as a component of a *means of egress* shall not be more than 180 pounds (801 N).

**Exception:** A *breakout* force in excess of 180 pounds (801 N) is permitted if the collapsing force is reduced to not more than 130 pounds (578 N) when not less than one of the following conditions is satisfied:

1. There is a power failure or power is removed to the device holding the door wings in position.
2. There is an actuation of the *automatic sprinkler system* where such system is provided.
3. There is an actuation of a smoke detection system that is installed in accordance with Section 907 to provide coverage in areas within the building that are within 75 feet (22 860 mm) of the revolving doors.
4. There is an actuation of a manual control switch, in an approved location and clearly identified, that reduces the *breakout* force to not more than 130 pounds (578 N).

#### **1010.1.4.2 Power-operated doors.**

Where *means of egress* doors are operated or assisted by power, the design shall be such that in the event of power failure, the door is capable of being opened manually to permit *means of egress* travel or closed where necessary to safeguard *means of egress*. The forces required to open these doors manually shall not exceed those specified in Section 1010.1.3, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of swinging open from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. Power-operated swinging doors, power-operated sliding doors and poweroperated folding doors shall comply with BHMA A156.10. Power-assisted swinging doors and lowenergy power-operated swinging doors shall comply with BHMA A156.19.

#### **Exceptions:**

1. Occupancies in Group I-3.
2. Horizontal sliding doors complying with Section 1010.1.4.3.
3. For a biparting door in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-inch (813 mm) single-leaf requirement of Section 1010.1.1, provided a minimum 32-inch (813 mm) clear opening is provided when the two biparting leaves meeting in the center are broken out.

#### **1010.1.4.3 Special purpose horizontal sliding, accordion or folding doors.**

In other than Group H occupancies, special purpose horizontal sliding, accordion or folding door assemblies permitted to be a component of a *means of egress* in accordance with Exception 6 to Section 1010.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method from both sides without special knowledge or effort.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.
4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable *fire protection rating* and, where

rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 716.5.9.3, shall be installed in accordance with NFPA 80 and shall comply with Section 716.

6. The door assembly shall have an integrated standby power supply.

7. The door assembly power supply shall be electrically supervised.

8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

#### **1010.1.4.4 Security grilles.**

In Groups B, F, M and S, horizontal sliding or vertical security grilles are permitted at the main *exit* and shall be openable from the inside without the use of a key or special knowledge or effort during periods that the space is occupied. The grilles shall remain secured in the full-open position during the period of occupancy by the general public. Where two or more *means of egress* are required, not more than one-half of the *exits* or *exit access doorways* shall be equipped with horizontal sliding or vertical security grilles.

#### **1010.1.5 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. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

#### **Exceptions:**

1. Doors serving individual *dwelling units* in Groups R-2 and R-3 where the following apply:

1.1. A door is permitted to open at the top step of an interior *flight of stairs*, provided the door does not swing over the top step.

1.2. Screen doors and storm doors are permitted to swing over *stairs* or landings.

2. Exterior doors as provided for in Section 1003.5, Exception 1, and Section 1022.2, which are not on an *accessible route*.

3. In Group R-3 occupancies not required to be *Accessible units*, *Type A units* or *Type B units*, the landing at an exterior doorway shall be not more than 7<sup>3</sup>/<sub>4</sub> inches (197 mm) below the top of the threshold, provided the door, other than an exterior storm or screen door, does not swing over the landing.

4. Variations in elevation due to differences in finish materials, but not more than 1/2 inch (12.7 mm).

5. Exterior decks, patios or balconies that are part of *Type B dwelling units*, have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit.

6. Doors serving equipment spaces not required to be *accessible* in accordance with Section 1103.2.9 and serving an occupant load of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

#### **1010.1.6 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). Where 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. Landings shall have a length measured in the direction of travel of not less than 44 inches (1118 mm).

**Exception:** Landing length in the direction of travel in Groups R-3 and U and within individual units of Group R-2 need not exceed 36 inches (914 mm).

#### **1010.1.7 Thresholds.**

Thresholds at doorways shall not exceed  $\frac{3}{4}$  inch (19.1 mm) in height above the finished floor or landing for sliding doors serving dwelling units or  $\frac{1}{2}$  inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than  $\frac{1}{4}$  inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope).

#### **Exceptions:**

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to  $7\frac{3}{4}$  inches (197 mm) in height if all of the following apply:

1.1. The door is not part of the required *means of egress*.

1.2. The door is not part of an *accessible route* as required by Chapter 11.

1.3. The door is not part of an *Accessible unit*, *Type A unit* or *Type B unit*.

2. In *Type B units*, where Exception 5 to Section 1010.1.5 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed  $4\frac{3}{4}$  inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or  $4\frac{1}{2}$  inches (114 mm) above the exterior deck, patio or balcony for other doors.



#### **1010.1.8 Door arrangement.**

Space between two doors in a series shall be 48 inches (1219 mm) minimum plus the width of a door swinging into the space. Doors in a series shall swing either in the same direction or away from the space between the doors.

#### **Exceptions:**

1. The minimum distance between horizontal sliding power-operated doors in a series shall be 48 inches (1219 mm).
2. Storm and screen doors serving individual *dwelling units* in Groups R-2 and R-3 need not be spaced 48 inches (1219 mm) from the other door.
3. Doors within individual *dwelling units* in Groups R-2 and R-3 other than within *Type A dwelling units*.

#### **1010.1.9 Door operations.**

Except as specifically permitted by this section, egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.

##### **1010.1.9.1 Hardware.**

Door handles, pulls, latches, locks and other operating devices on doors required to be *accessible* by Chapter 11 shall not require tight grasping, tight pinching or twisting of the wrist to operate.

##### **1010.1.9.2 Hardware height.**

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 used only for security purposes and not used for normal operation are permitted at any height.

**Exception:** Access doors or gates in barrier walls and fences protecting pools, spas and hot tubs shall be permitted to have operable parts of the release of latch on self-latching devices at 54 inches (1370 mm) maximum above the finished floor or ground, provided the self-latching devices are not also self locking devices operated by means of a key, electronic opener or integral combination lock.

##### **1010.1.9.3 Locks and latches.**

Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:

2.1. The locking device is readily distinguishable as locked.

2.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

2.3. The use of the key-operated locking device is revocable by the *building official* for due cause.

3. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.

4. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.

5. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.

#### **1010.1.9.4 Bolt locks.**

Manually operated flush bolts or surface bolts are not permitted.

#### **Exceptions:**

1. On doors not required for egress in individual *dwelling units* or *sleeping units*.

2. Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf.

3. Where a pair of doors serves an *occupant load* of less than 50 persons in a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.

4. Where a pair of doors serves a Group B, F or S occupancy, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf provided such inactive leaf is not needed to meet egress capacity requirements and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1. The inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.

5. Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge- or surface-mounted bolts are permitted on the inactive leaf provided that

the inactive leaf is not needed to meet egress capacity requirements and the inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.

#### **1010.1.9.5 Unlatching.**

The unlatching of any door or leaf shall not require more than one operation.

#### **Exceptions:**

1. Places of detention or restraint.
2. Where manually operated bolt locks are permitted by Section 1010.1.9.4.
3. Doors with automatic flush bolts as permitted by Section 1010.1.9.3, Item 3.
4. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.1.9.3, Item 4.

#### **1010.1.9.5.1 Closet and bathroom doors in Group R-4 occupancies.**

In Group R-4 occupancies, closet doors that latch in the closed position shall be openable from inside the closet, and bathroom doors that latch in the closed position shall be capable of being unlocked from the ingress side.

#### **1010.1.9.6 Controlled egress doors in Groups I-1 and I-2.**

Electric locking systems, including electromechanical locking systems and electromagnetic locking systems, shall be permitted to be locked in the means of egress in Group I-1 or I-2 occupancies where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved automatic smoke or heat detection system* installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door locks shall unlock on actuation of the *automatic sprinkler system* or *automatic fire detection system*.
2. The door locks shall unlock on loss of power controlling the lock or lock mechanism.
3. The door locking system shall be installed to have the capability of being unlocked by a switch located at the *fire command center*, a nursing station or other approved location. The switch shall directly break power to the lock.
4. A building occupant shall not be required to pass through more than one door equipped with a controlled egress locking system before entering an exit.
5. The procedures for unlocking the doors shall be described and approved as part of the emergency planning and preparedness required by Chapter 4 of the *International*

*Fire Code.*

6. All clinical staff shall have the keys, codes or other means necessary to operate the locking systems.
7. Emergency lighting shall be provided at the door.
8. The door locking system units shall be listed in accordance with UL 294.

**Exceptions:**

1. Items 1 through 4 shall not apply to doors to areas occupied by persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric treatment area.
2. Items 1 through 4 shall not apply to doors to areas where a *listed* egress control system is utilized to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 hospital.

**1010.1.9.7 Delayed egress.**

Delayed egress locking systems shall be permitted to be installed on doors serving any occupancy except Group A, E and H in buildings that are equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved automatic smoke or heat detection system* installed in accordance with Section 907. The locking system shall be installed and operated in accordance with all of the following:

1. The delay electronics of the delayed egress locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate, free egress.
2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.
3. The delayed egress locking system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.

**Exception:** Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. The egress path from any point shall not pass through more than one delayed egress locking system.

**Exception:** In Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

6.1. For doors that swing in the direction of egress, the sign shall read: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.2. For doors that swing in the opposite direction of egress, the sign shall read: PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.3. The sign shall comply with the visual character requirements in ICC A117.1.

**Exception:** Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.

7. Emergency lighting shall be provided on the egress side of the door.

8. The delayed egress locking system units shall be listed in accordance with UL 294.

#### **1010.1.9.8 Sensor release of electrically locked egress doors.**

The electric locks on sensor released doors located in a *means of egress* in buildings with an occupancy in Group A, B, E, I-1, I-2, I-4, M, R-1 or R-2 and entrance doors to tenant spaces in occupancies in Group A, B, E, I-1, I-2, I-4, M, R-1 or R-2 are permitted where installed and operated in accordance with all of the following criteria:

1. The sensor shall be installed on the egress side, arranged to detect an occupant approaching the doors. The doors shall be arranged to unlock by a signal from or loss of power to the sensor.

2. Loss of power to the lock or locking system shall automatically unlock the doors.

3. The doors shall be arranged to unlock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads "PUSH TO EXIT." When operated, the manual unlocking device shall result in direct interruption of power to the lock—independent of other electronics—and the doors shall remain unlocked for not less than 30 seconds.

4. Activation of the building *fire alarm system*, where provided, shall automatically unlock the doors, and the doors shall remain unlocked until the fire alarm system has been reset.

5. Activation of the building *automatic sprinkler system* or *fire detection system*, where provided, shall automatically unlock the doors. The doors shall remain unlocked until the *fire alarm system* has been reset.

6. The door locking system units shall be listed in accordance with UL 294.

#### **1010.1.9.9 Electromagnetically locked egress doors.**

Doors in the *means of egress* in buildings with an occupancy in Group A, B, E, I-1, I-2, I-4, M, R-1 or R-2 and doors to tenant spaces in Group A, B, E, I-1, I-2, I-4, M, R-1 or R-2 shall be permitted to be locked with an electromagnetic locking system where equipped with hardware that incorporates a built-in switch and where installed and operated in accordance with all of the following:

1. The hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.

2. The hardware is capable of being operated with one hand.

3. Operation of the hardware directly interrupts the power to the electromagnetic lock and unlocks the door immediately.

4. Loss of power to the locking system automatically unlocks the door.

5. Where *panic* or *fire exit hardware* is required by Section 1010.1.10, operation of the *panic* or *fire exit hardware* also releases the electromagnetic lock.

6. The locking system units shall be listed in accordance with UL 294.

#### **1010.1.9.10 Locking arrangements in correctional facilities.**

In occupancies in Groups A-2, A-3, A-4, B, E, F, I-2, I-3, M and S within correctional and detention facilities, doors in *means of egress* serving rooms or spaces occupied by persons whose movements are controlled for security reasons shall be permitted to be locked where equipped with egress control devices that shall unlock manually and by not less than one of the following means:

1. Activation of an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.

2. Activation of an *approved manual fire alarm box*.

3. A signal from a *constantly attended location*.

#### **1010.1.9.11 Stairway doors.**

Interior *stairway means of egress* doors shall be openable from both sides without the use of a key or special knowledge or effort.

#### **Exceptions:**

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. In *stairways* serving not more than four stories, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the *fire command center*, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.
4. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.2.
5. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single *exit stairway* where permitted in Section 1006.3.2.

#### **1010.1.10 Panic and fire exit hardware.**

Doors serving a Group H occupancy and 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*.

#### **Exceptions:**

1. A main *exit* of a Group A occupancy shall be permitted to be locking in accordance with Section 1010.1.9.3, Item 2.
2. Doors serving a Group A or E occupancy shall be permitted to be electromagnetically locked in accordance with Section 1010.1.9.9.

Electrical rooms with equipment rated 1,200 amperes or more and over 6 feet (1829 mm) wide, and that contain overcurrent devices, switching devices or control devices with *exit* or *exit access doors*, shall be equipped with *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.

#### **1010.1.10.1 Installation.**

Where *panic* or *fire exit hardware* is installed, it shall comply with the following:

1. *Panic hardware* shall be *listed* in accordance with UL 305.
2. *Fire exit hardware* shall be *listed* in accordance with UL 10C and UL 305.
3. The actuating portion of the releasing device shall extend not less than one-half of the door leaf width.
4. The maximum unlatching force shall not exceed 15 pounds (67 N).

#### **1010.1.10.2 Balanced doors.**

If *balanced doors* are used and *panic hardware* is required, the *panic hardware* shall be the push-pad type and the pad shall not extend more than one-half the width of the door measured from the latch side.

#### **1010.2 Gates.**

Gates serving the *means of egress* system shall comply with the requirements of this section. Gates used as a component in a *means of egress* shall conform to the applicable requirements for doors.

**Exception:** Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.

#### **1010.2.1 Stadiums.**

*Panic hardware* is not required on gates surrounding stadiums where such gates are under constant immediate supervision while the public is present, and where safe dispersal areas based on 3 square feet (0.28 m<sup>2</sup>) per occupant are located between the fence and enclosed space. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from the enclosed space. See Section 1028.5 for *means of egress* from safe dispersal areas.

#### **1010.3 Turnstiles.**

Turnstiles or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required *means of egress*.

**Exception:** Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person *occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by an employee in the area.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.



4. Each device has not less than 16<sup>1</sup>/<sub>2</sub> inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

Where located as part of an *accessible route*, turnstiles shall have not less than 36 inches (914 mm) clear at and below a height of 34 inches (864 mm), not less than 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

#### **1010.3.1 High turnstile.**

Turnstiles more than 39 inches (991 mm) high shall meet the requirements for revolving doors.

#### **1010.3.2 Additional door.**

Where serving an *occupant load* greater than 300, each turnstile that is not portable shall have a side-hinged swinging door that conforms to Section 1010.1 within 50 feet (15 240 mm).

### **SECTION 1011 STAIRWAYS**

#### **1011.1 General.**

*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.

**Exception:** Within rooms or spaces used for assembly purposes, stepped aisles shall comply with Section 1029.

#### **1011.2 Width and capacity.**

The required capacity of *stairways* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm). See Section 1009.3 for accessible *means of egress stairways*.

#### **Exceptions:**

1. *Stairways* serving an *occupant load* of less than 50 shall have a width of not less than 36 inches (914 mm).

2. *Spiral stairways* as provided for in Section 1011.10.

3. Where an incline platform lift or stairway chairlift is installed on *stairways* serving occupancies in Group R-3, or within *dwelling units* in occupancies in Group R-2, a clear passage width not less than 20 inches (508 mm) shall be provided. Where the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

### **1011.3 Headroom.**

*Stairways* shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the edge of the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* and landing.

#### **Exceptions:**

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than 4<sup>3</sup>/<sub>4</sub> inches (121 mm).

### **1011.4 Walkline.**

The walkline across *winder* treads shall be concentric to the direction of travel through the turn and located 12 inches (305 mm) from the side where the *winders* are narrower. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear *stair* width at the walking surface of the *winder*. Where *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

### **1011.5 Stair treads and risers.**

*Stair* treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

#### **1011.5.1 Dimension reference surfaces.**

For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

#### **1011.5.2 Riser height and tread depth.**

*Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the *stair*.

#### **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1029.13.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be 7<sup>3</sup>/<sub>4</sub> inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum winder tread depth at the walkline shall be 10 inches (254 mm); and the minimum winder tread depth shall be 6 inches (152 mm). A nosing projection not less than <sup>3</sup>/<sub>4</sub> inch (19.1 mm) but not more than 1<sup>1</sup>/<sub>4</sub> inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 403.1 of the *International Existing Building Code* for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m<sup>2</sup>) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

#### **1011.5.3 Winder treads.**

*Winder* treads are not permitted in *means of egress* stairways except within a *dwelling unit*.

#### **Exceptions:**

1. Curved *stairways* in accordance with Section 1011.9.
2. *Spiral stairways* in accordance with Section 1011.10.

#### **1011.5.4 Dimensional uniformity.**

*Stair* treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed <sup>3</sup>/<sub>8</sub> inch (9.5 mm) in any *flight of stairs*. The greatest *winder* tread depth at the walkline within any *flight of stairs* shall not exceed the smallest by more than <sup>3</sup>/<sub>8</sub> inch (9.5 mm).

#### **Exceptions:**

1. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to comply with the dimensional nonuniformity in Section 1029.13.2.
2. Consistently shaped *winders*, complying with Section 1011.5, differing from rectangular treads in the same *flight of stairs*.

### 3. Nonuniform riser dimension complying with Section 1011.5.4.1.

#### **1011.5.4.1 Nonuniform height risers.**

Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The *nosings* or leading edges of treads at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair* and shall have a slip-resistant surface. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

#### **1011.5.5 Nosing and riser profile.**

*Nosings* shall have a curvature or bevel of not less than  $\frac{1}{16}$  inch (1.6 mm) but not more than  $\frac{9}{16}$  inch (14.3 mm) from the foremost projection of the tread. Risers shall be solid and vertical or sloped under the tread above from the underside of the *nosing* above at an angle not more than 30 degrees (0.52 rad) from the vertical.

##### **1011.5.5.1 Nosing projection size.**

The leading edge (*nosings*) of treads shall project not more than  $1\frac{1}{4}$  inches (32 mm) beyond the tread below.

##### **1011.5.5.2 Nosing projection uniformity.**

*Nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosing's* leading edge of the floor at the top of a *flight*.

##### **1011.5.5.3 Solid risers.**

Risers shall be solid.

#### **Exceptions:**

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

#### **1011.6 Stairway landings.**

There shall be a floor or landing at the top and bottom of each *stairway*. The width of

landings shall be not less than the width of *stairways* served. Every landing shall have a minimum width measured perpendicular to the direction of travel equal to the width of the *stairway*. Where the *stairway* has a straight run the depth need not exceed 48 inches (1219 mm). Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

**Exception:** Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1029.

#### **1011.7 Stairway construction.**

*Stairways* shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood *handrails* shall be permitted for all types of construction.

##### **1011.7.1 Stairway walking surface.**

The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

##### **Exceptions:**

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of  $\frac{1}{2}$ -inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided a sphere with a diameter of  $1\frac{1}{8}$  inches (29 mm) cannot pass through the opening.

##### **1011.7.2 Outdoor conditions.**

Outdoor *stairways* and outdoor approaches to *stairways* shall be designed so that water will not accumulate on walking surfaces.

##### **1011.7.3 Enclosures under interior stairways.**

The walls and soffits within enclosed usable spaces under enclosed and unenclosed stairways shall be protected by 1-hour fire-resistance-rated construction or the fire-resistance rating of the stairway enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the stairway enclosure.

**Exception:** Spaces under *stairways* serving and contained within a single residential

dwelling unit in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with  $1\frac{1}{2}$ -inch (12.7 mm) gypsum board.

#### **1011.7.4 Enclosures under exterior stairways.**

There shall not be enclosed usable space under *exterior exit stairways* unless the space is completely enclosed in 1-hour fire-resistance-rated construction. The open space under *exterior stairways* shall not be used for any purpose.

#### **1011.8 Vertical rise.**

A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

**Exception:** Spiral stairways used as a means of egress from technical production areas.

#### **1011.9 Curved stairways.**

Curved stairways with winder treads shall have treads and risers in accordance with Section 1011.5 and the smallest radius shall be not less than twice the minimum width or required capacity of the stairway.

**Exception:** The radius restriction shall not apply to curved stairways in Group R-3 and within individual dwelling units in Group R-2.

#### **1011.10 Spiral stairways.**

*Spiral stairways* are permitted to be used as a component in the *means of egress* only within *dwelling units* or from a space not more than 250 square feet (23 m<sup>2</sup>) in area and serving not more than five occupants, or from *technical production areas* in accordance with Section 410.6.

A *spiral stairway* shall have a  $7\frac{1}{2}$ -inch (191 mm) minimum clear tread depth at a point 12 inches (305 mm) from the narrow edge. The risers shall be sufficient to provide a headroom of 78 inches (1981 mm) minimum, but riser height shall not be more than  $9\frac{1}{2}$  inches (241 mm). The minimum *stairway* clear width at and below the *handrail* shall be 26 inches (660 mm).

#### **1011.11 Handrails.**

*Stairways* shall have *handrails* on each side and shall comply with Section 1014. Where glass is used to provide the *handrail*, the *handrail* shall comply with Section 2407.

#### **Exceptions:**

1. *Stairways* within dwelling units and *spiral stairways* are permitted to have a *handrail* on one side only.
2. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a

landing do not require *handrails*.

3. In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require *handrails*.

4. Changes in room elevations of three or fewer risers within dwelling units and sleeping units in Group R- 2 and R-3 do not require *handrails*.

#### **1011.12 Stairway to roof.**

In buildings four or more stories above *grade plane*, one *stairway* shall extend to the roof surface unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope).

**Exception:** Other than where required by Section 1011.12.1, in buildings without an occupied roof access to the roof from the top story shall be permitted to be by an *alternating tread device*, a ships ladder or a permanent ladder.

##### **1011.12.1 Stairway to elevator equipment.**

Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a stairway.

##### **1011.12.2 Roof access.**

Where a stairway is provided to a roof, access to the roof shall be provided through a penthouse complying with Section 1510.2.

**Exception:** In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m<sup>2</sup>) in area and having a minimum dimension of 2 feet (610 mm).

#### **1011.13 Guards.**

Guards shall be provided along stairways and landings where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by guards installed in accordance with Section 1015.

#### **1011.14 Alternating tread devices.**

*Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a mezzanine not more than 250 square feet (23 m<sup>2</sup>) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m<sup>2</sup>) in area and for access to unoccupied roofs. *Alternating tread devices* used as a means of egress shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

##### **1011.14.1 Handrails of alternating tread devices.**

Handrails shall be provided on both sides of alternating tread devices and shall comply with Section 1014.

#### **1011.14.2 Treads of alternating tread devices.**

*Alternating tread devices* shall have a minimum tread depth of 5 inches (127 mm), a minimum projected tread depth of 8<sup>1</sup>/<sub>2</sub> inches (216 mm), a minimum tread width of 7 inches (178 mm) and a maximum riser height of 9<sup>1</sup>/<sub>2</sub> inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

**Exception:** *Alternating tread devices* used as an element of a *means of egress* in buildings from a mezzanine area not more than 250 square feet (23 m<sup>2</sup>) in area that serves not more than five occupants shall have a minimum tread depth of 3 inches (76 mm) with a minimum projected tread depth of 10<sup>1</sup>/<sub>2</sub> inches (267 mm). The rise to the next alternating tread surface shall not exceed 8 inches (203 mm).

#### **1011.15 Ships ladders.**

Ships ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m<sup>2</sup>) with not more than three occupants and for access to unoccupied roofs. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm).

##### **1011.15.1 Handrails of ships ladders.**

*Handrails* shall be provided on both sides of ships ladders.

##### **1011.15.2 Treads of ships ladders.**

Ships ladders shall have a minimum tread depth of 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the *nosing* projection is not less than 8<sup>1</sup>/<sub>2</sub> inches (216 mm). The maximum riser height shall be 9<sup>1</sup>/<sub>2</sub> inches (241 mm).

#### **1011.16 Ladders.**

Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.



3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupied roofs that are not required to have *stairway* access in accordance with Section 1011.12.1.
6. Ladders shall be constructed in accordance with Section 306.5 of the *International Mechanical Code*.

## **SECTION 1012 RAMPS**

### **1012.1 Scope.**

The provisions of this section shall apply to ramps used as a component of a *means of egress*.

### **Exceptions:**

1. Ramped *aisles* within assembly rooms or spaces shall comply with the provisions in Section 1029.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an *accessible route* serving *accessible* parking spaces, other required *accessible* elements or part of an accessible *means of egress*.

### **1012.2 Slope.**

*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).

### **1012.3 Cross slope.**

The slope measured perpendicular to the direction of travel of a *ramp* shall not be steeper than one unit vertical in 48 units horizontal (2-percent slope).

### **1012.4 Vertical rise.**

The rise for any *ramp* run shall be 30 inches (762 mm) maximum.

### **1012.5 Minimum dimensions.**

The minimum dimensions of *means of egress ramps* shall comply with Sections 1012.5.1 through 1012.5.3.

**1012.5.1 Width and capacity.**

The minimum width and required capacity of a *means of egress ramp* shall be not less than that required for *corridors* by Section 1020.2. The clear width of a *ramp* between *handrails*, if provided, or other permissible projections shall be 36 inches (914 mm) minimum.

**1012.5.2 Headroom.**

The minimum headroom in all parts of the *means of egress ramp* shall be not less than 80 inches (2032 mm).

**1012.5.3 Restrictions.**

*Means of egress ramps* shall not reduce in width in the direction of egress travel. Projections into the required *ramp* and landing width are prohibited. Doors opening onto a landing shall not reduce the clear width to less than 42 inches (1067 mm).

**1012.6 Landings.**

*Ramps* shall have landings at the bottom and top of each *ramp*, points of turning, entrance, exits and at doors. Landings shall comply with Sections 1012.6.1 through 1012.6.5.

**1012.6.1 Slope.**

Landings shall have a slope not steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. Changes in level are not permitted.

**1012.6.2 Width.**

The landing width shall be not less than the width of the widest *ramp* run adjoining the landing.

**1012.6.3 Length.**

The landing length shall be 60 inches (1525 mm) minimum.

**Exceptions:**

1. In Group R-2 and R-3 individual *dwelling* and *sleeping units* that are not required to be *Accessible units*, *Type A units* or *Type B units* in accordance with Section 1107, landings are permitted to be 36 inches (914 mm) minimum.

2. Where the *ramp* is not a part of an *accessible route*, the length of the landing shall not be required to be more than 48 inches (1220 mm) in the direction of travel.

**1012.6.4 Change in direction.**

Where changes in direction of travel occur at landings provided between *ramp* runs, the landing shall be 60 inches by 60 inches (1524 mm by 1524 mm) minimum.

**Exception:** In Group R-2 and R-3 individual *dwelling* or *sleeping units* that are not

required to be *Accessible units*, *Type A units* or *Type B units* in accordance with Section 1107, landings are permitted to be 36 inches by 36 inches (914 mm by 914 mm) minimum.

#### **1012.6.5 Doorways.**

Where doorways are located adjacent to a *ramp* landing, maneuvering clearances required by *ICC A117.1* are permitted to overlap the required landing area.

#### **1012.7 Ramp construction.**

*Ramps* shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood *handrails* shall be permitted for all types of construction.

##### **1012.7.1 Ramp surface.**

The surface of *ramps* shall be of slip-resistant materials that are securely attached.

##### **1012.7.2 Outdoor conditions.**

Outdoor *ramps* and outdoor approaches to *ramps* shall be designed so that water will not accumulate on walking surfaces.

#### **1012.8 Handrails.**

*Ramps* with a rise greater than 6 inches (152 mm) shall have *handrails* on both sides. *Handrails* shall comply with Section 1014.

#### **1012.9 Guards.**

*Guards* shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015.

#### **1012.10 Edge protection.**

Edge protection complying with Section 1012.10.1 or 1012.10.2 shall be provided on each side of *ramp* runs and at each side of *ramp* landings.

#### **Exceptions:**

1. Edge protection is not required on *ramps* that are not required to have *handrails*, provided they have flared sides that comply with the *ICC A117.1* curb ramp provisions.
2. Edge protection is not required on the sides of *ramp* landings serving an adjoining *ramp* run or *stairway*.
3. Edge protection is not required on the sides of *ramp* landings having a vertical dropoff of not more than  $\frac{1}{2}$  inch (12.7 mm) within 10 inches (254 mm) horizontally of the required landing area.

##### **1012.10.1 Curb, rail, wall or barrier.**

A curb, rail, wall or barrier shall be provided to serve as edge protection. A curb shall 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.

#### **1012.10.2 Extended floor or ground surface.**

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.

### **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 no point in an *exit access corridor* or *exit passageway* is more than 100 feet (30 480 mm) or the *listed* viewing distance for the sign, whichever is less, from the nearest visible exit sign.

#### **Exceptions:**

1. Exit signs are not required in rooms or areas that require only one *exit* or *exit access*.
2. Main exterior *exit* doors or gates that are obviously and clearly identifiable as *exits* need not have exit signs where *approved* by the *building official*.
3. Exit signs are not required in occupancies in Group U and individual *sleeping units* or *dwelling units* in Group R-1, R-2 or R-3.
4. Exit signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, exit signs are not required on the seating side of vomitories or openings into seating areas where exit signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

#### **1013.2 Floor-level exit signs in Group R-1.**

Where exit signs are required in Group R-1 occupancies by Section 1013.1, additional low-level exit signs shall be provided in all areas serving guest rooms in Group R-1 occupancies and shall comply with Section 1013.5.

The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 12 inches (305 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm)

of the door frame on the latch side.

### **1013.3 Illumination.**

Exit signs shall be internally or externally illuminated.

**Exception:** Tactile signs required by Section 1013.4 need not be provided with illumination.

### **1013.4 Raised character and braille exit signs.**

A sign stating EXIT in visual characters, raised characters and braille and complying with *ICC A117.1* shall be provided adjacent to each door to an *area of refuge*, an exterior area for assisted rescue, an *exit stairway or ramp*, an *exit passageway* and the *exit discharge*.

### **1013.5 Internally illuminated exit signs.**

Electrically powered, *self-luminous* and *photoluminescent* exit signs shall be *listed* and *labeled* in accordance with UL 924 and shall be installed in accordance with the manufacturer's instructions and Chapter 27. Exit signs shall be illuminated at all times.

### **1013.6 Externally illuminated exit signs.**

Externally illuminated exit signs shall comply with Sections 1013.6.1 through 1013.6.3.

#### **1013.6.1 Graphics.**

Every exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than  $\frac{3}{4}$  inch (19.1 mm) wide. The word "EXIT" shall have letters having a width not less than 2 inches (51 mm) wide, except the letter "I," and the minimum spacing between letters shall be not less than  $\frac{3}{8}$  inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.

The word "EXIT" shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.

#### **1013.6.2 Exit sign illumination.**

The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

#### **1013.6.3 Power source.**

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 power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Chapter 27.

**Exceptions:**

1. *Approved* exit sign illumination means that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.
2. Group I-2 Condition 2 exit sign illumination shall not be provided by unit equipment battery only.

**SECTION 1014 HANDRAILS****1014.1 Where required.**

*Handrails* serving *stairways*, *ramps*, stepped *aisles* and ramped *aisles* shall be adequate in strength and attachment in accordance with Section 1607.8. *Handrails* required for *stairways* by Section 1011.11 shall comply with Sections 1014.2 through 1014.9. *Handrails* required for *ramps* by Section 1012.8 shall comply with Sections 1014.2 through 1014.8. *Handrails* for stepped *aisles* and ramped *aisles* required by Section 1029.15 shall comply with Sections 1014.2 through 1014.8.

**1014.2 Height.**

*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). *Handrail* height of *alternating tread devices* and ships ladders, measured above tread *nosings*, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

**Exceptions:**

1. Where handrail fittings or bendings are used to provide continuous transition between *flights*, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual *dwelling units* in Group R-2 occupancies; where handrail fittings or bendings are used to provide continuous transition between *flights*, transition at *winder* treads, transition from *handrail* to *guard*, or where used at the start of a *flight*, the *handrail* height at the fittings or bendings shall be permitted to exceed the maximum height.
3. *Handrails* on top of a guard where permitted along stepped aisles and ramped aisles in accordance with Section 1029.15.

### **1014.3 Handrail graspability.**

Required *handrails* shall comply with Section 1014.3.1 or shall provide equivalent graspability.

**Exception:** In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.3.1, Type II in accordance with Section 1014.3.2 or shall provide equivalent graspability.

#### **1014.3.1 Type I.**

*Handrails* with a circular cross section shall have an outside diameter of not less than  $1\frac{1}{4}$  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  $6\frac{1}{4}$  inches (160 mm) with a maximum cross-sectional dimension of  $2\frac{1}{4}$  inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

#### **1014.3.2 Type II.**

*Handrails* with a perimeter greater than  $6\frac{1}{4}$  inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of  $\frac{3}{4}$  inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than  $\frac{5}{16}$  inch (8 mm) within  $\frac{7}{8}$  inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than  $\frac{3}{8}$  inch (10 mm) to a level that is not less than  $1\frac{3}{4}$  inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than  $1\frac{1}{4}$  inches (32 mm) to not greater than  $2\frac{3}{4}$  inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

### **1014.4 Continuity.**

Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

#### **Exceptions:**

1. *Handrails* within *dwelling units* are permitted to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within  $1\frac{1}{2}$  inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions. For each  $\frac{1}{2}$  inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of  $1\frac{1}{2}$  inches (38 mm) shall be permitted to be reduced by  $\frac{1}{8}$  inch

(3.2 mm).

4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.

5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1029.15.1.

#### **1014.5 Fittings.**

*Handrails* shall not rotate within their fittings.

#### **1014.6 Handrail extensions.**

*Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the handrail of an adjacent *flight* of *stairs* or *ramp* run. Where *handrails* are not continuous between *flights*, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the *flights* of *stairs* at *stairways* and the *ramp* runs at *ramps*.

#### **Exceptions:**

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.

2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1029.15.

3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

#### **1014.7 Clearance.**

Clear space between a handrail and a wall or other surface shall be not less than 1½ inches (38 mm). A handrail and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

#### **1014.8 Projections.**

On *ramps* and on ramped *aisles* that are part of an *accessible route*, the clear width between *handrails* shall be 36 inches (914 mm) minimum. Projections into the required width of *aisles*, *stairways* and *ramps* at each side shall not exceed 4½ 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. Projections due to



intermediate *handrails* shall not constitute a reduction in the egress width. Where a pair of intermediate *handrails* are provided within the *stairway* width without a walking surface between the pair of intermediate *handrails* and the distance between the pair of intermediate *handrails* is greater than 6 inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of *handrails* that is greater than 6 inches (152 mm).

#### **1014.9 Intermediate handrails.**

*Stairways* shall have intermediate *handrails* located in such a manner 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.

### **SECTION 1015 GUARDS**

#### **1015.1 General.**

*Guards* shall comply with the provisions of Sections 1015.2 through 1015.7. Operable windows with sills located more than 72 inches (1829 mm) above finished grade or other surface below shall comply with Section 1015.8.

#### **1015.2 Where required.**

*Guards* shall be located along open-sided walking surfaces, including *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.8.

**Exception:** *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross aisles in accordance with Section 1029.16.2.

### **1015.2.1 Glazing.**

Where glass is used to provide a *guard* or as a portion of the *guard* system, the *guard* shall comply with Section 2407. Where the glazing provided does not meet the strength and attachment requirements of Section 1607.8, complying *guards* shall be located along glazed sides of open-sided walking surfaces.

### **1015.3 Height.**

Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the leading edges of the tread *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the *guard*.

### **Exceptions:**

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three stories above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces or adjacent *fixed seating*.
2. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* also serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. The *guard* height in assembly seating areas shall comply with Section 1029.16 as applicable.
5. Along *alternating tread devices* and ships ladders, *guards* where the top rail also serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread *nosing*.

### **1015.4 Opening limitations.**

Required *guards* shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required *guard* height.

**Exceptions:**

1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), *guards* shall not have openings that allow passage of a sphere  $4\frac{3}{8}$  inches (111 mm) in diameter.
2. The triangular openings at the open sides of a *stair*, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for *alternating tread devices* and ships ladders, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, *guards* required at the end of aisles in accordance with Section 1029.16.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, *guards* shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual *dwelling units* and *sleeping units* in Group R-2 and R-3 occupancies, *guards* on the open sides of *stairs* shall not have openings that allow passage of a sphere  $4\frac{3}{8}$  (111 mm) inches in diameter.

**1015.5 Screen porches.**

Porches and decks that are enclosed with insect screening shall be provided with *guards* where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

**1015.6 Mechanical equipment, systems and devices.**

*Guards* shall be provided where various components that require service are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The *guard* shall extend not less than 30 inches (762 mm) beyond each end of such components. The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

**Exception:** *Guards* are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10

feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from the roof edge or open side of the walking surface.

#### **1015.7 Roof access.**

*Guards* shall be provided where the roof hatch opening is located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below.

The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

**Exception:** *Guards* are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from the roof edge or open side of the walking surface.

#### **1015.8 Window openings.**

Windows in Group R-2 and R-3 buildings including *dwelling units*, where the top of the sill of an operable window opening is located less than 36 inches above the finished floor and more than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, shall comply with one of the following:

1. Operable windows where the top of the sill of the opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below and that are provided with window fall prevention devices that comply with ASTM F2006.
2. Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position.
3. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F2090.
4. Operable windows that are provided with window opening control devices that comply with Section 1015.8.1.

##### **1015.8.1 Window opening control devices.**

Window opening control devices shall comply with ASTM F2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1030.2.

## **SECTION 1016 EXIT ACCESS**

### **1016.1 General.**

The *exit access* shall comply with the applicable provisions of Sections 1003 through

1015. *Exit access* arrangement shall comply with Sections 1016 through 1021.

**1016.2 Egress through intervening spaces.**

Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Access to not less than one of the required *exit* shall be provided without travel through the enclosed elevator lobbies required by Section 3006. Where the path of exit access travel passes through an enclosed elevator lobby, the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an *exit* is required by other sections of this code.

2. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an *exit*.

**Exception:** *Means of egress* are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy where the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.

3. An *exit access* shall not pass through a room that can be locked to prevent egress.

4. *Means of egress* from *dwelling units* or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.

5. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

**Exceptions:**

1. *Means of egress* are not prohibited through a kitchen area serving adjoining rooms constituting part of the same *dwelling unit* or *sleeping unit*.

2. *Means of egress* are not prohibited through stockrooms in Group M occupancies where all of the following are met:

2.1. The stock is of the same hazard classification as that found in the main retail area.

2.2. Not more than 50 percent of the *exit access* is through the stockroom.

2.3. The stockroom is not subject to locking from the egress side.

2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) *aisle* defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the *exit* without obstructions.

### 1016.2.1 Multiple tenants.

Where more than one tenant occupies any one floor of a building or structure, each tenant space, *dwelling unit* and *sleeping unit* shall be provided with access to the required *exits* without passing through adjacent tenant spaces, *dwelling units* and *sleeping units*.

**Exception:** The *means of egress* from a smaller tenant space shall not be prohibited from passing through a larger adjoining tenant space where such rooms or spaces of the smaller tenant occupy less than 10 percent of the area of the larger tenant space through which they pass; are the same or similar occupancy group; a discernible path of egress travel to an *exit* is provided; and the *means of egress* into the adjoining space is not subject to locking from the egress side. A required *means of egress* serving the larger tenant space shall not pass through the smaller tenant space or spaces.

## SECTION 1017 EXIT ACCESS TRAVEL DISTANCE

### 1017.1 General.

Travel distance within the *exit access* portion of the *means of egress* system shall be in accordance with this section.

### 1017.2 Limitations.

*Exit access* travel distance shall not exceed the values given in Table 1017.2.

**TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE<sup>a</sup>**

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

For SI: 1 foot = 304.8 mm.

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

Section 402.8: For the distance limitation in malls.

Section 404.9: For the distance limitation through an atrium space.

Section 407.4: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.

Section 411.4: For the distance limitation in special amusement buildings.

Section 412.7: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.2: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1029.7: For increased limitation in assembly seating.

Section 3103.4: For temporary structures. Section 3104.9: For pedestrian walkways.

b. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where *automatic sprinkler systems* are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.1.

### **1017.2.1 Exterior egress balcony increase.**

*Exit access* travel distances specified in Table 1017.2 shall be increased up to an additional 100 feet (30 480 mm) provided the last portion of the *exit access* leading to the *exit* occurs on an exterior egress balcony constructed in accordance with Section 1021. The length of such balcony shall be not less than the amount of the increase taken.

### **1017.2.2 Group F-1 and S-1 increase.**

The maximum *exit access* travel distance shall be 400 feet (122 m) in Group F-1 or S-1 occupancies where all of the following conditions are met:

1. The portion of the building classified as Group F-1 or S-1 is limited to one story in height.
2. The minimum height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet (7315 mm).
3. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

### **1017.3 Measurement.**

*Exit access* travel distance shall be measured from the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an *exit*.

**Exception:** In *open parking garages*, *exit access* travel distance is permitted to be measured to the closest riser of an *exit access stairway* or the closest slope of an *exit access ramp*.

### **1017.3.1 Exit access stairways and ramps.**

Travel distance on *exit access stairways* or *ramps* shall be included in the *exit*

access travel distance measurement. The measurement along *stairways* shall be made on a plane parallel and tangent to the *stair* treadnosings in the center of the *stair* and landings. The measurement along *ramps* shall be made on the walking surface in the center of the *ramp* and landings.

## **SECTION 1018 AISLES**

### **1018.1 General.**

*Aisles* and *aisle accessways* serving as a portion of the *exit access* in the *means of egress* system shall comply with the requirements of this section. *Aisles* or *aisle accessways* shall be provided from all occupied portions of the *exit access* that contain seats, tables, furnishings, displays and similar fixtures or equipment. The minimum width or required capacity of *aisles* shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

### **1018.2 Aisles in assembly spaces.**

*Aisles* and *aisle accessways* serving a room or space used for assembly purposes shall comply with Section 1029.

### **1018.3 Aisles in Groups B and M.**

In Group B and M occupancies, the minimum clear aisle width shall be determined by Section 1005.1 for the *occupant load* served, but shall be not less than that required for corridors by Section 1020.2.

**Exception:** Nonpublic *aisles* serving less than 50 people and not required to be *accessible* by Chapter 11 need not exceed 28 inches (711 mm) in width.

### **1018.4 Aisle accessways in Group M.**

An *aisle accessway* shall be provided on not less than one side of each element within the *merchandise pad*. The minimum clear width for an *aisle accessway* not required to be *accessible* shall be 30 inches (762 mm). The required clear width of the *aisle accessway* shall be measured perpendicular to the elements and merchandise within the *merchandise pad*. The 30-inch (762 mm) minimum clear width shall be maintained to provide a path to an adjacent *aisle* or *aisle accessway*. The *common path of egress travel* shall not exceed 30 feet (9144 mm) from any point in the *merchandise pad*.

**Exception:** For areas serving not more than 50 occupants, the *common path of egress travel* shall not exceed 75 feet (22 860 mm).

### **1018.5 Aisles in other than assembly spaces and Groups B and M.**

In other than rooms or spaces used for assembly purposes and Group B and M occupancies, the minimum clear *aisle* capacity shall be determined by Section 1005.1 for the occupant load served, but the width shall be not less than that required for corridors by Section 1020.2.



**Exception:** Nonpublic *aisles* serving less than 50 people and not required to be *accessible* by Chapter 11 need not exceed 28 inches (711 mm) in width.

## **SECTION 1019 EXIT ACCESS STAIRWAYS AND RAMPS**

### **1019.1 General.**

*Exit access stairways* and *ramps* serving as an *exit access* component in a *means of egress* system shall comply with the requirements of this section. The number of stories connected by *exit access stairways* and *ramps* shall include *basements*, but not *mezzanines*.

### **1019.2 All occupancies.**

*Exit access stairways* and *ramps* that serve floor levels within a single story are not required to be enclosed.

### **1019.3 Occupancies other than Groups I-2 and I-3.**

In other than Group I-2 and I-3 occupancies, floor openings containing *exit access stairways* or *ramps* that do not comply with one of the conditions listed in this section shall be enclosed with a shaft enclosure constructed in accordance with Section 713.

1. *Exit access stairways* and *ramps* that serve or atmospherically communicate between only two stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, *exit access stairways* and *ramps* connecting four stories or less serving and contained within an individual *dwelling unit* or *sleeping unit* or *live/work unit*.
3. *Exit access stairways* serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.
4. *Exit access stairways* and *ramps* in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the *stairway* or *ramp* and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.
5. *Exit access stairways* and *ramps* within an *atrium* complying with the provisions of Section 404.
6. *Exit access stairways* and *ramps* in *open parking garages* that serve only the parking garage.
7. *Exit access stairways* and *ramps* serving open-air seating complying with the *exit access travel distance* requirements of Section 1029.7.

8. *Exit access stairways and ramps* serving the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.

#### **1019.4 Group I-2 and I-3 occupancies.**

In Group I-2 and I-3 occupancies, floor openings between stories containing *exit access stairways* or *ramps* are required to be enclosed with a shaft enclosure constructed in accordance with Section 713.

**Exception:** In Group I-3 occupancies, *exit access stairways* or *ramps* constructed in accordance with Section 408 are not required to be enclosed.

### **SECTION 1020 CORRIDORS**

#### **1020.1 Construction.**

*Corridors* shall be fire-resistance rated in accordance with Table 1020.1.

The *corridor walls* required to be fire-resistance rated shall comply with Section 708 for *fire partitions*.

#### **Exceptions:**

1. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required *means of egress* doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.

2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.

3. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.

4. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B that is a space requiring only a single *means of egress* complying with Section 1006.2.

5. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 602 and unprotected openings are permitted by Table 705.8.

**TABLE 1020.1 CORRIDOR FIRE-RESISTANCE RATING**

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system <sup>c</sup>
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 30	Not Permitted	1

A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5
I-2 <sup>a</sup> , I-4	All	Not Permitted	0
I-1, I-3	All	Not Permitted	<sup>b</sup> <sub>1</sub>

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.

b. For a reduction in the *fire-resistance rating* for occupancies in Group I-3, see Section 408.8.

c. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

### 1020.2 Width and capacity.

The required capacity of *corridors* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than that specified in Table 1020.2.

**Exception:** In Group I-2 occupancies, *corridors* are not required to have a clear width of 96 inches (2438 mm) in areas where there will not be stretcher or bed movement for access to care or as part of the defend-in-place strategy.

**TABLE 1020.2 MINIMUM CORRIDOR WIDTH**

OCCUPANCY	MINIMUM WIDTH (inches)
Any facilities not listed below	44
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24
With an occupant load of less than 50	36
Within a <i>dwelling unit</i>	36
In Group E with a <i>corridor</i> having an occupant load of 100 or more	72
In <i>corridors</i> and areas serving stretcher traffic in occupancies where patients receive outpatient medical care that causes the patient to be incapable of self-preservation	72
Group I-2 in areas where required for bed movement	96

For SI: 1 inch = 25.4 mm.

### 1020.3 Obstruction.

The minimum width or required capacity of *corridors* shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

### 1020.4 Dead ends.

Where more than one *exit* or *exit access doorway* is required, the *exit access* shall be arranged such that there are no dead ends in *corridors* more than 20 feet (6096 mm) in length.

**Exceptions:**

1. In occupancies in Group I-3 of Condition 2, 3 or 4, the dead end in a *corridor* shall not exceed 50 feet (15 240 mm).
2. In occupancies in Groups B, E, F, I-1, M, R-1, R-2, R-4, S and U, where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the length of the dead-end *corridor* shall not exceed 50 feet (15 240 mm).
3. A dead-end *corridor* shall not be limited in length where the length of the dead-end *corridor* is less than 2.5 times the least width of the dead-end *corridor*.

**1020.5 Air movement in corridors.**

*Corridors* shall not serve as supply, return, exhaust, relief or ventilation air ducts.

**Exceptions:**

1. Use of a *corridor* as a source of makeup air for exhaust systems in rooms that open directly onto such *corridors*, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted, provided that each such *corridor* is directly supplied with outdoor air at a rate greater than the rate of makeup air taken from the *corridor*.
2. Where located within a *dwelling unit*, the use of *corridors* for conveying return air shall not be prohibited.
3. Where located within tenant spaces of 1,000 square feet (93 m<sup>2</sup>) or less in area, utilization of *corridors* for conveying return air is permitted.
4. Incidental air movement from pressurized rooms within health care facilities, provided that the *corridor* is not the primary source of supply or return to the room.

**1020.5.1 Corridor ceiling.**

Use of the space between the *corridor* ceiling and the floor or roof structure above as a return air plenum is permitted for one or more of the following conditions:

1. The *corridor* is not required to be of *fire-resistance-rated* construction.
2. The *corridor* is separated from the plenum by *fire-resistance-rated* construction.
3. The air-handling system serving the *corridor* is shut down upon activation of the air-handling unit *smoke detectors* required by the *International Mechanical Code*.

4. The air-handling system serving the *corridor* is shut down upon detection of sprinkler water flow where the building is equipped throughout with an *automatic sprinkler system*.

5. The space between the *corridor* ceiling and the floor or roof structure above the *corridor* is used as a component of an approved engineered smoke control system.

#### **1020.6 Corridor continuity.**

*Fire-resistance-rated corridors* shall be continuous from the point of entry to an *exit*, and shall not be interrupted by intervening rooms. Where the path of egress travel within a *fire-resistance-rated corridor* to the exit includes travel along unenclosed *exit access stairways* or *ramps*, the *fire-resistance rating* shall be continuous for the length of the *stairway* or *ramp* and for the length of the connecting *corridor* on the adjacent floor leading to the *exit*.

#### **Exceptions:**

1. Foyers, lobbies or reception rooms constructed as required for *corridors* shall not be construed as intervening rooms.

2. Enclosed elevator lobbies as permitted by Item 1 of Section 1016.2 shall not be construed as intervening rooms.

### **SECTION 1021 EGRESS BALCONIES**

#### **1021.1 General.**

Balconies used for egress purposes shall conform to the same requirements as *corridors* for minimum width, required capacity, headroom, dead ends and projections.

#### **1021.2 Wall separation.**

Exterior egress balconies shall be separated from the interior of the building by walls and opening protectives as required for *corridors*.

**Exception:** Separation is not required where the exterior egress balcony is served by not less than two *stairways* and a dead-end travel condition does not require travel past an unprotected opening to reach a *stairway*.

#### **1021.3 Openness.**

The long side of an egress balcony shall be at least 50 percent open, and the open area above the *guards* shall be so distributed as to minimize the accumulation of smoke or toxic gases.

#### **1021.4 Location.**

Exterior egress balconies shall have a minimum *fire separation distance* of 10 feet

(3048 mm) measured at right angles from the exterior edge of the egress balcony to the following:

1. Adjacent *lot lines*.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

## **SECTION 1022 EXITS**

### **1022.1 General.**

*Exits* shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of *exit* protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*. *Exits* shall be continuous from the point of entry into the *exit* to the *exit discharge*.

### **1022.2 Exterior exit doors.**

Buildings or structures used for human occupancy shall have not less than one exterior door that meets the requirements of Section 1010.1.1.

#### **1022.2.1 Detailed requirements.**

Exterior *exit* doors shall comply with the applicable requirements of Section 1010.1.

#### **1022.2.2 Arrangement.**

Exterior *exit* doors shall lead directly to the *exit discharge* or the *public way*.

## **SECTION 1023 INTERIOR EXIT STAIRWAYS AND RAMPS**

### **1023.1 General.**

*Interior exit stairways* and *ramps* serving as an *exit* component in a *means of egress* system shall comply with the requirements of this section. *Interior exit stairways* and *ramps* shall be enclosed and lead directly to the exterior of the building or shall be extended to the exterior of the building with an *exit passageway* conforming to the requirements of Section 1024, except as permitted in Section 1028.1. An *interior exit stairway* or *ramp* shall not be used for any purpose other than as a *means of egress* and a circulation path.

### **1023.2 Construction.**

Enclosures for *interior exit stairways* and *ramps* shall be constructed as *fire barriers* in

accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the *interior exit stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. *Interior exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

**Exceptions:**

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. *Interior exit stairways* within an *atrium* enclosed in accordance with Section 404.6.

**1023.3 Termination.**

*Interior exit stairways* and *ramps* shall terminate at an *exit discharge* or a *public way*.

**Exception:** A combination of *interior exit stairways*, *interior exit ramps* and *exit passageways*, constructed in accordance with Sections 1023.2, 1023.3.1 and 1024, respectively, and forming a continuous protected enclosure, shall be permitted to extend an *interior exit stairway* or *ramp* to the *exit discharge* or a *public way*.

**1023.3.1 Extension.**

Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door* assembly complying with Section 716.5 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door* assembly are prohibited. Penetrations of the *fire barrier* are prohibited.

**Exceptions:**

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.

**1023.4 Openings.**

*Interior exit stairway* and *ramp* opening protectives shall be in accordance with the requirements of Section 716.

Openings in *interior exit stairways* and *ramps* other than unprotected exterior openings shall be limited to those necessary for *exit access* to the enclosure from normally occupied spaces and for egress from the enclosure.

Elevators shall not open into *interior exit stairways* and *ramps*.

### **1023.5 Penetrations.**

Penetrations into or through *interior exit stairways* and *ramps* are prohibited except for equipment and ductwork necessary for independent ventilation or pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication systems and electrical raceway serving the *interior exit stairway* and *ramp* and terminating at a steel box not exceeding 16 square inches (0.010 m<sup>2</sup>). Such penetrations shall be protected in accordance with Section 714. There shall not be penetrations or communication openings, whether protected or not, between adjacent *interior exit stairways* and *ramps*.

**Exception:** Membrane penetrations shall be permitted on the outside of the *interior exit stairway* and *ramp*. Such penetrations shall be protected in accordance with Section 714.3.2.

### **1023.6 Ventilation.**

Equipment and ductwork for *interior exit stairway* and *ramp* ventilation as permitted by Section 1023.5 shall comply with one of the following items:

1. Such equipment and ductwork shall be located exterior to the building and shall be directly connected to the *interior exit stairway* and *ramp* by ductwork enclosed in construction as required for shafts.
2. Where such equipment and ductwork is located within the *interior exit stairway* and *ramp*, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or such air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, such equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the *fire-resistance-rated* construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 for shaft enclosures.

The *interior exit stairway* and *ramp* ventilation systems shall be independent of other building ventilation systems.

### **1023.7 Interior exit stairway and ramp exterior walls.**

*Exterior walls* of the *interior exit stairway* or *ramp* shall comply with the requirements of



Section 705 for *exterior walls*. Where nonrated walls or unprotected openings enclose the exterior of the *stairway* or *ramps* and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building *exterior walls* within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a *fire-resistance rating* of not less than 1 hour. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than  $\frac{3}{4}$  hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the *stairway* or *ramp*, or to the roof line, whichever is lower.

### **1023.8 Discharge identification.**

An *interior exit stairway* and *ramp* shall not continue below its *level of exit discharge* unless an *approved* barrier is provided at the *level of exit discharge* to prevent persons from unintentionally continuing into levels below. Directional exit signs shall be provided as specified in Section 1013.

### **1023.9 Stairway identification signs.**

A sign shall be provided at each floor landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stairway* or *ramp*. The signage shall also state the story of, and the direction to, the *exit discharge* and the availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. In addition to the *stairway* identification sign, a floor-level sign in visual characters, raised characters and braille complying with *ICC A117.1* shall be located at each floor-level landing adjacent to the door leading from the *interior exit stairway* and *ramp* into the *corridor* to identify the floor level.

#### **1023.9.1 Signage requirements.**

*Stairway* identification signs shall comply with all of the following requirements:

1. The signs shall be a minimum size of 18 inches (457 mm) by 12 inches (305 mm).
2. The letters designating the identification of the *interior exit stairway* and *ramp* shall be not less than  $1\frac{1}{2}$  inches (38 mm) in height.
3. The number designating the floor level shall be not less than 5 inches (127 mm) in height and located in the center of the sign.
4. Other lettering and numbers shall be not less than 1 inch (25 mm) in height.
5. Characters and their background shall have a nonglare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.

6. Where signs required by Section 1023.9 are installed in the *interior exit stairways* and *ramps* of buildings subject to Section 1025, the signs shall be made of the same materials as required by Section 1025.4.

**1023.10 Elevator lobby identification signs.**

At landings in *interior exit stairways* where two or more doors lead to the floor level, any door with direct access to an enclosed elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating "Elevator Lobby." Signage shall be in accordance with Section 1023.9.1, Items 4, 5 and 6.

**1023.11 Smokeproof enclosures.**

Where required by Section 403.5.4 or 405.7.2, *interior exit stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

**1023.11.1 Termination and extension.**

A *smokeproof enclosure* shall terminate at an *exit discharge* or a *public way*.

The *smokeproof enclosure* shall be permitted to be extended by an *exit passageway* in accordance with Section 1023.3. The *exit passageway* shall be without openings other than the *fire door assembly* required by Section 1023.3.1 and those necessary for egress from the *exit passageway*. The *exit passageway* shall be separated from the remainder of the building by 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

**Exceptions:**

1. Openings in the *exit passageway* serving a *smokeproof enclosure* are permitted where the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*, and openings are protected as required for access from other floors.
2. The *fire barrier* separating the *smokeproof enclosure* from the *exit passageway* is not required, provided the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*.
3. A *smokeproof enclosure* shall be permitted to egress through areas on the *level of exit discharge* or vestibules as permitted by Section 1028.

**1023.11.2 Enclosure access.**

Access to the *stairway* or *ramp* within a *smokeproof enclosure* shall be by way of a vestibule or an open exterior balcony.

**Exception:** Access is not required by way of a vestibule or exterior balcony for *stairways* and *ramps* using the pressurization alternative complying with Section 909.20.5.

**SECTION 1024 EXIT PASSAGEWAYS**

**1024.1 Exit passageways.**

*Exit passageways* serving as an exit component in a *means of egress* system shall comply with the requirements of this section. An *exit passageway* shall not be used for any purpose other than as a *means of egress* and *acirculation path*.

**1024.2 Width.**

The required capacity of *exit passageways* shall be determined as specified in Section 1005.1 but the minimum width shall be not less than 44 inches (1118 mm), except that *exit passageways* serving an occupant load of less than 50 shall be not less than 36 inches (914 mm) in width. The minimum width or required capacity of *exit passageways* shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

**1024.3 Construction.**

*Exit passageway* enclosures shall have walls, floors and ceilings of not less than a 1-hour *fire-resistance rating*, and not less than that required for any connecting *interior exit stairway* or *ramp*. *Exit passageways* shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.

**1024.4 Termination.**

*Exit passageways* on the *level of exit discharge* shall terminate at an *exit discharge*. *Exit passageways* on other levels shall terminate at an *exit*.

**1024.5 Openings.**

*Exit passageway* opening protectives shall be in accordance with the requirements of Section 716.

Except as permitted in Section 402.8.7, openings in *exit passageways* other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section 1023.3.1.

Elevators shall not open into an *exit passageway*.

**1024.6 Penetrations.**

Penetrations into or through an *exit passageway* are prohibited except for equipment and ductwork necessary for independent pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication and electrical raceway serving the *exit passageway* and terminating at a steel box not exceeding 16 square inches (0.010 m<sup>2</sup>). Such penetrations shall be protected in accordance with Section 714. There

shall not be penetrations or communicating openings, whether protected or not, between adjacent *exit passageways*.

**Exception:** Membrane penetrations shall be permitted on the outside of the *exit passageway*. Such penetrations shall be protected in accordance with Section 714.3.2.

#### **1024.7 Ventilation.**

Equipment and ductwork for *exit passageway* ventilation as permitted by Section 1024.6 shall comply with one of the following:

1. The equipment and ductwork shall be located exterior to the building and shall be directly connected to the *exit passageway* by ductwork enclosed in construction as required for shafts.
2. Where the equipment and ductwork is located within the *exit passageway*, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or the air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, the equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 for shaft enclosures.

*Exit passageway* ventilation systems shall be independent of other building ventilation systems.

### **SECTION 1025 LUMINOUS EGRESS PATH MARKINGS**

#### **1025.1 General.**

*Approved* luminous egress path markings delineating the exit path shall be provided in *high-rise buildings* of Group A, B, E, I, M, and R-1 occupancies in accordance with Sections 1025.1 through 1025.5.

**Exception:** Luminous egress path markings shall not be required on the *level of exit discharge* in lobbies that serve as part of the exit path in accordance with Section 1028.1, Exception 1.

#### **1025.2 Markings within exit components.**

Egress path markings shall be provided in *interior exit stairways*, *interior exit ramps* and *exit passageways*, in accordance with Sections 1025.2.1 through 1025.2.6.

##### **1025.2.1 Steps.**

A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Outlining stripes shall have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 2 inches (51 mm). The leading edge of the stripe shall be placed not more than  $\frac{1}{2}$  inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than  $\frac{1}{2}$  inch (12.7 mm) down the vertical face of the step.

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

#### **1025.2.2 Landings.**

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

#### **1025.2.3 Handrails.**

*Handrails* and handrail extensions shall be marked with a solid and continuous stripe having a minimum width of 1 inch (25 mm). The stripe shall be placed on the top surface of the *handrail* for the entire length of the *handrail*, including extensions and newel post caps. Where *handrails* or handrail extensions bend or turn corners, the stripe shall not have a gap of more than 4 inches (102 mm).

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

#### **1025.2.4 Perimeter demarcation lines.**

Stair landings and other floor areas within *interior exit stairways*, *interior exit ramps* and *exit passageways*, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both. The stripes shall be 1 to 2 inches (25 mm to 51 mm) wide with interruptions not exceeding 4 inches (102 mm).

**Exception:** The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

##### **1025.2.4.1 Floor-mounted demarcation lines.**

Perimeter demarcation lines shall be placed within 4 inches (102 mm) of the wall and shall extend to within 2 inches (51 mm) of the markings on the leading edge of landings. The demarcation lines shall continue across the floor in front of all doors.

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

##### **1025.2.4.2 Wall-mounted demarcation lines.**

Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe not more than 4 inches (102 mm) above the finished floor. At the top or bottom of the *stairs*, demarcation lines shall drop vertically to the floor within 2 inches (51 mm) of

the step or landing edge. Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.

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

#### **1025.2.4.3 Transition.**

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

#### **1025.2.5 Obstacles.**

Obstacles at or below 6 feet 6 inches (1981 mm) in height and projecting more than 4 inches (102 mm) into the egress path shall be outlined with markings not less than 1 inch (25 mm) in width comprised of a pattern of alternating equal bands, of luminous material and black, with the alternating bands not more than 2 inches (51 mm) thick and angled at 45 degrees (0.79 rad). Obstacles shall include, but are not limited to, standpipes, hose cabinets, wall projections and restricted height areas. However, such markings shall not conceal any required information or indicators including but not limited to instructions to occupants for the use of standpipes.

#### **1025.2.6 Doors within the exit path.**

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

##### **1025.2.6.1 Emergency exit symbol.**

The doors shall be identified by a low-location luminous emergency exit symbol complying with NFPA 170. The exit symbol shall be not less than 4 inches (102 mm) in height and shall be mounted on the door, centered horizontally, with the top of the symbol not higher than 18 inches (457 mm) above the finished floor.

##### **1025.2.6.2 Door hardware markings.**

Door hardware shall be marked with not less than 16 square inches (406 mm<sup>2</sup>) of luminous material. This marking shall be located behind, immediately adjacent to, or on the door handle or escutcheon. Where a panic bar is installed, such material shall not be less than 1 inch (25 mm) wide for the entire length of the actuating bar or touchpad.

##### **1025.2.6.3 Door frame markings.**

The top and sides of the door frame shall be marked with a solid and continuous 1-inch- to 2-inch-wide (25 mm to 51 mm) stripe. Where the door molding does not provide sufficient flat surface on which to locate the stripe, the stripe shall be permitted to be located on the wall surrounding the frame.

### **1025.3 Uniformity.**

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

### **1025.4 Self-luminous and photoluminescent.**

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

1. UL 1994.
2. ASTM E2072, except that the charging source shall be 1 footcandle (11 lux) of fluorescent illumination for 60 minutes, and the minimum luminance shall be 30 milicandelas per square meter at 10 minutes and 5 milicandelas per square meter after 90 minutes.

### **1025.5 Illumination.**

Where *photoluminescent* exit path markings are installed, they shall be provided with not less than 1 footcandle (11 lux) of illumination for not less than 60 minutes prior to periods when the building is occupied and continuously during occupancy.

## **SECTION 1026 HORIZONTAL EXITS**

### **1026.1 Horizontal exits.**

*Horizontal exits* serving as an *exit* in a *means of egress* system shall comply with the requirements of this section. A *horizontal exit* shall not serve as the only *exit* from a portion of a building, and where two or more *exits* are required, not more than one-half of the total number of *exits* or total *exit* minimum width or required capacity shall be *horizontal exits*.

#### **Exceptions:**

1. *Horizontal exits* are permitted to comprise two-thirds of the required *exits* from any building or floor area for occupancies in Group I-2.
2. *Horizontal exits* are permitted to comprise 100 percent of the *exits* required for occupancies in Group I-3. Not less than 6 square feet (0.6 m<sup>2</sup>) of accessible space per occupant shall be provided on each side of the *horizontal exit* for the total number of people in adjoining compartments.

### **1026.2 Separation.**

The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by a *fire wall* complying with Section 706; or by a *fire barrier* complying with

Section 707 or a *horizontal assembly* complying with Section 711, or both. The minimum *fire-resistance rating* of the separation shall be 2 hours. Opening protectives in *horizontal exits* shall also comply with Section 716. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours with no unprotected openings.

**Exception:** A *fire-resistance rating* is not required at *horizontal exits* between a building area and an above-grade *pedestrian walkway* constructed in accordance with Section 3104, provided that the distance between connected buildings is more than 20 feet (6096 mm).

*Horizontal exits* constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

### **1026.3 Opening protectives.**

*Fire doors* in *horizontal exits* shall be self-closing or automatic-closing when activated by a *smoke detector* in accordance with Section 716.5.9.3. Doors, where located in a cross-corridor condition, shall be automatic-closing by activation of a *smoke detector* installed in accordance with Section 716.5.9.3.

### **1026.4 Refuge area.**

The refuge area of a *horizontal exit* shall be a space occupied by the same tenant or a public area and each such refuge area shall be adequate to accommodate the original *occupant load* of the refuge area plus the *occupant load* anticipated from the adjoining compartment. The anticipated *occupant load* from the adjoining compartment shall be based on the capacity of the *horizontal exit doors* entering the refuge area.

#### **1026.4.1 Capacity.**

The capacity of the refuge area shall be computed based on a *net floor area* allowance of 3 square feet (0.2787 m<sup>2</sup>) for each occupant to be accommodated therein.

**Exceptions:** The *net floor area* allowable per occupant shall be as follows for the indicated occupancies:

1. Six square feet (0.6 m<sup>2</sup>) per occupant for occupancies in Group I-3.
2. Fifteen square feet (1.4 m<sup>2</sup>) per occupant for ambulatory occupancies in Group I-2.
3. Thirty square feet (2.8 m<sup>2</sup>) per occupant for nonambulatory occupancies in Group I-2.

#### **1026.4.2 Number of exits.**

The refuge area into which a *horizontal exit* leads shall be provided with *exits* adequate to meet the occupant requirements of this chapter, but not including the added *occupant*



*load* imposed by persons entering the refuge area through *horizontal exits* from other areas. Not less than one refuge area exit shall lead directly to the exterior or to an *interior exit stairway* or *ramp*.

**Exception:** The adjoining compartment shall not be required to have a *stairway* or door leading directly outside, provided the refuge area into which a *horizontal exit* leads has *stairways* or doors leading directly outside and are so arranged that egress shall not require the occupants to return through the compartment from which egress originates.

## **SECTION 1027 EXTERIOR EXIT STAIRWAYS AND RAMPS**

### **1027.1 Exterior exit stairways and ramps.**

*Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall comply with this section.

### **1027.2 Use in a means of egress.**

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

### **1027.3 Open side.**

*Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and *guards*. An open side shall have not less than 35 square feet (3.3 m<sup>2</sup>) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

### **1027.4 Side yards.**

The open areas adjoining *exterior exit stairways* or *ramps* shall be either *yards*, *courts* or *public ways*; the remaining sides are permitted to be enclosed by the *exterior walls* of the building.

### **1027.5 Location.**

*Exterior exit stairways* and *ramps* shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent *lot lines*.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation*

*distance.*

For the purposes of this section, other portions of the building shall be treated as separate buildings.

#### **1027.6 Exterior exit stairway and ramp protection.**

*Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the exterior wall shall be rated in accordance with Section 1023.7.

#### **Exceptions:**

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.

2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.

3. Separation from the open-ended *corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:

3.1. The building, including open-ended *corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

3.2. The open-ended *corridors* comply with Section 1020.

3.3. The open-ended *corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027.

3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.

3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m<sup>2</sup>) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

## SECTION 1028 EXIT DISCHARGE

### 1028.1 General.

*Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required exits.

#### Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas on the level of discharge provided all of the following conditions are met:

1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided all of the following conditions are met:

2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708.

**Exception:** The maximum transmitted temperature rise is not required.

2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

### **1028.2 Exit discharge width or capacity.**

The minimum width or required capacity of the *exit discharge* shall be not less than the minimum width or required capacity of the *exits* being served.

### **1028.3 Exit discharge components.**

*Exit discharge* components shall be sufficiently open to the exterior so as to minimize the accumulation of smoke and toxic gases.

### **1028.4 Egress courts.**

*Egress courts* serving as a portion of the *exit discharge* in the *means of egress* system shall comply with the requirements of Sections 1028.4.1 and 1028.4.2.

#### **1028.4.1 Width or capacity.**

The required capacity of *egress courts* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm), except as specified herein. *Egress courts* serving Group R-3 and U occupancies shall be not less than 36 inches (914 mm) in width. The required capacity and width of *egress courts* shall be unobstructed to a height of 7 feet (2134 mm).

**Exception:** Encroachments complying with Section 1005.7.

Where an *egress court* exceeds the minimum required width and the width of such *egress court* is then reduced along the path of exit travel, the reduction in width shall be gradual. The transition in width shall be affected by a guard not less than 36 inches (914 mm) in height and shall not create an angle of more than 30 degrees (0.52 rad) with respect to the axis of the *egress court* along the path of egress travel. The width of the *egress court* shall not be less than the required capacity.

#### **1028.4.2 Construction and openings.**

Where an *egress court* serving a building or portion thereof is less than 10 feet (3048 mm) in width, the *egress court* walls shall have not less than 1-hour *fire-resistance-rated* construction for a distance of 10 feet (3048 mm) above the floor of the *egress court*. Openings within such walls shall be protected by opening protectives having a fire

protection rating of not less than  $\frac{3}{4}$  hour.

**Exceptions:**

1. *Egress courts* serving an *occupant load* of less than 10.
2. *Egress courts* serving Group R-3.

**1028.5 Access to a public way.**

The *exit discharge* shall provide a direct and unobstructed access to a *public way*.

**Exception:** Where access to a *public way* cannot be provided, a safe dispersal area shall be provided where all of the following are met:

1. The area shall be of a size to accommodate not less than 5 square feet (0.46 m<sup>2</sup>) for each person.
2. The area shall be located on the same lot not less than 50 feet (15 240 mm) away from the building requiring egress.
3. The area shall be permanently maintained and identified as a safe dispersal area.
4. The area shall be provided with a safe and unobstructed path of travel from the building.

**SECTION 1029 ASSEMBLY**

**1029.1 General.**

A room or space used for assembly purposes that contains seats, tables, displays, equipment or other material shall comply with this section.

**1029.1.1 Bleachers.**

*Bleachers*, *grandstands* and *folding and telescopic seating*, that are not building elements, shall comply with ICC 300.

**1029.1.1.1 Spaces under grandstands and bleachers.**

Where spaces under *grandstands* or *bleachers* are used for purposes other than ticket booths less than 100 square feet (9.29 m<sup>2</sup>) and toilet rooms, such spaces shall be separated by *fire barriers* complying with Section 707 and *horizontal assemblies* complying with Section 711 with not less than 1-hour *fire-resistance-rated* construction.

**1029.2 Assembly main exit.**

A building, room or space used for assembly purposes that has an *occupant load* of greater than 300 and is provided with a main *exit*, that main *exit* shall be of sufficient capacity to accommodate not less than onehalf of the *occupant load*, but such capacity

shall be not less than the total required capacity of all *means of egress* leading to the *exit*. Where the building is classified as a Group A occupancy, the main *exit* shall front on not less than one street or an unoccupied space of not less than 10 feet (3048 mm) in width that adjoins a street or *public way*. In a building, room or space used for assembly purposes where there is not a well-defined main *exit* or where multiple main *exits* are provided, *exits* shall be permitted to be distributed around the perimeter of the building provided that the total capacity of egress is not less than 100 percent of the required capacity.

### **1029.3 Assembly other exits.**

In addition to having access to a main *exit*, each level in a building used for assembly purposes having an *occupant load* greater than 300 and provided with a main *exit*, shall be provided with additional *means of egress* that shall provide an egress capacity for not less than one-half of the total *occupant load* served by that level and shall comply with Section 1007.1. In a building used for assembly purposes where there is not a well-defined main *exit* or where multiple main *exits* are provided, *exits* for each level shall be permitted to be distributed around the perimeter of the building, provided that the total width of egress is not less than 100 percent of the required width.

### **1029.4 Foyers and lobbies.**

In Group A-1 occupancies, where persons are admitted to the building at times when seats are not available, such persons shall be allowed to wait in a lobby or similar space, provided such lobby or similar space shall not encroach upon the minimum width or required capacity of the *means of egress*. Such foyer, if not directly connected to a public street by all the main entrances or *exits*, shall have a straight and unobstructed *corridor* or path of travel to every such main entrance or *exit*.

### **1029.5 Interior balcony and gallery means of egress.**

For balconies, galleries or press boxes having a seating capacity of 50 or more located in a building, room or space used for assembly purposes, not less than two *means of egress* shall be provided, with one from each side of every balcony, gallery or press box.

### **1029.6 Capacity of aisle for assembly.**

The required capacity of *aisles* shall be not less than that determined in accordance with Section 1029.6.1 where *smoke-protected assembly seating* is not provided and with Section 1029.6.2 or 1029.6.3 where *smoke-protected assembly seating* is provided.

#### **1029.6.1 Without smoke protection.**

The required capacity in inches (mm) of the *aisles* for assembly seating without smoke protection shall be not less than the *occupant load* served by the egress element in accordance with all of the following, as applicable:

1. Not less than 0.3 inch (7.6 mm) of *aisle* capacity for each occupant served shall be provided on stepped *aisles* having riser heights 7 inches (178 mm) or less and tread depths 11 inches (279 mm) or greater, measured horizontally between tread *nosings*.

2. Not less than 0.005 inch (0.127 mm) of additional *aisle* capacity for each occupant shall be provided for each 0.10 inch (2.5 mm) of riser height above 7 inches (178 mm).

3. Where egress requires stepped *aisle* descent, not less than 0.075 inch (1.9 mm) of additional *aisle* capacity for each occupant shall be provided on those portions of *aisle* capacity having no *handrail* within a horizontal distance of 30 inches (762 mm).

4. Ramped *aisles*, where slopes are steeper than one unit vertical in 12 units horizontal (8-percent slope), shall have not less than 0.22 inch (5.6 mm) of clear *aisle* capacity for each occupant served. Level or ramped *aisles*, where slopes are not steeper than one unit vertical in 12 units horizontal (8-percent slope), shall have not less than 0.20 inch (5.1 mm) of clear *aisle* capacity for each occupant served.

#### **1029.6.2 Smoke-protected assembly seating.**

The required capacity in inches (mm) of the aisle for *smoke-protected assembly seating* shall be not less than the occupant load served by the egress element multiplied by the appropriate factor in Table 1029.6.2. The total number of seats specified shall be those within the space exposed to the same smoke-protected environment. Interpolation is permitted between the specific values shown. A life safety evaluation, complying with NFPA 101, shall be done for a facility utilizing the reduced width requirements of Table 1029.6.2 for *smoke-protected assembly seating*.

**Exception:** For outdoor *smoke-protected assembly seating* with an *occupant load* not greater than 18,000, the required capacity in inches (mm) shall be determined using the factors in Section 1029.6.3.

**TABLE 1029.6.2 CAPACITY FOR AISLES FOR SMOKE-PROTECTED ASSEMBLY**

TOTAL NUMBER OF SEATS IN THE SMOKE-PROTECTED ASSEMBLY SEATING	INCHES OF CAPACITY PER SEAT SERVED			
	Stepped aisles with handrails within 30 inches	Stepped aisles without handrails within 30 inches	Level aisles or ramped aisles not steeper than 1 in 10 in slope	Ramped aisles steeper than 1 in 10 in slope
Equal to or less than 5,000	0.200	0.250	0.150	0.165
10,000	0.130	0.163	0.100	0.110
15,000	0.096	0.120	0.070	0.077
20,000	0.076	0.095	0.056	0.062
Equal to or greater than 25,000	0.060	0.075	0.044	0.048

For SI: 1 inch = 25.4 mm.

##### **1029.6.2.1 Smoke control.**

*Aisles* and *aisle accessways* serving a *smoke-protected assembly seating* area shall be

provided with a smoke control system complying with Section 909 or natural ventilation designed to maintain the smoke level not less than 6 feet (1829 mm) above the floor of the *means of egress*.

#### **1029.6.2.2 Roof height.**

A *smoke-protected assembly seating* area with a roof shall have the lowest portion of the roof deck not less than 15 feet (4572 mm) above the highest *aisle* or *aisle accessway*.

**Exception:** A roof canopy in an outdoor stadium shall be permitted to be less than 15 feet (4572 mm) above the highest *aisle* or *aisle accessway* provided that there are no objects less than 80 inches (2032 mm) above the highest *aisle* or *aisle accessway*.

#### **1029.6.2.3 Automatic sprinklers.**

Enclosed areas with walls and ceilings in buildings or structures containing *smoke-protected assembly seating* shall be protected with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1.

#### **Exceptions:**

1. The floor area used for contests, performances or entertainment provided the roof construction is more than 50 feet (15 240 mm) above the floor level and the use is restricted to low fire hazard uses.
2. Press boxes and storage facilities less than 1,000 square feet (93 m<sup>2</sup>) in area.
3. Outdoor seating facilities where seating and the *means of egress* in the seating area are essentially open to the outside.

#### **1029.6.3 Outdoor smoke-protected assembly seating.**

The required capacity in inches (mm) of *aisles* shall be not less than the total *occupant load* served by the egress element multiplied by 0.08 (2.0 mm) where egress is by stepped *aisle* and multiplied by 0.06 (1.52 mm) where egress is by level *aisles* and ramped *aisles*.

**Exception:** The required capacity in inches (mm) of *aisles* shall be permitted to comply with Section 1029.6.2 for the number of seats in the outdoor *smoke-protected assembly seating* where Section 1029.6.2 permits less capacity.

#### **1029.7 Travel distance.**

*Exits* and *aisles* shall be so located that the travel distance to an *exit* door shall be not greater than 200 feet (60 960 mm) measured along the line of travel in nonsprinklered buildings. Travel distance shall be not more than 250 feet (76 200 mm) in sprinklered buildings. Where *aisles* are provided for seating, the distance shall be measured along the *aisles* and *aisle accessways* without travel over or on the seats.



**Exceptions:**

1. *Smoke-protected assembly seating*: The travel distance from each seat to the nearest entrance to a vomitory or concourse shall not exceed 200 feet (60 960 mm). The travel distance from the entrance to the vomitory or concourse to a *stairway, ramp* or walk on the exterior of the building shall not exceed 200 feet (60 960 mm).
2. Open-air seating: The travel distance from each seat to the building exterior shall not exceed 400 feet (122 m). The travel distance shall not be limited in facilities of Type I or II construction.

**1029.8 Common path of egress travel.**

The *common path of egress travel* shall not exceed 30 feet (9144 mm) from any seat to a point where an occupant has a choice of two paths of egress travel to two *exits*.

**Exceptions:**

1. For areas serving less than 50 occupants, the *common path of egress travel* shall not exceed 75 feet (22 860 mm).
2. For *smoke-protected assembly seating*, the *common path of egress travel* shall not exceed 50 feet (15 240 mm).

**1029.8.1 Path through adjacent row.**

Where one of the two paths of travel is across the *aisle* through a row of seats to another *aisle*, there shall be not more than 24 seats between the two *aisles*, and the minimum clear width between rows for the row between the two *aisles* shall be 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row between *aisles*.

**Exception:** For *smoke-protected assembly seating* there shall be not more than 40 seats between the two *aisles* and the minimum clear width shall be 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat.

**1029.9 Assembly aisles are required.**

Every occupied portion of any building, room or space used for assembly purposes that contains seats, tables, displays, similar fixtures or equipment shall be provided with *aisles* leading to *exits* or *exit access doorways* in accordance with this section.

**1029.9.1 Minimum aisle width.**

The minimum clear width for *aisles* shall comply with one of the following:

1. Forty-eight inches (1219 mm) for stepped *aisles* having seating on each side.

**Exception:** Thirty-six inches (914 mm) where the stepped *aisles* serve less than 50

seats.

2. Thirty-six inches (914 mm) for stepped *aisles* having seating on only one side.

**Exception:** Twenty-three inches (584 mm) between a stepped *aisle handrail* and seating where a stepped *aisle* does not serve more than five rows on one side.

3. Twenty-three inches (584 mm) between a stepped *aisle handrail* or *guard* and seating where the stepped *aisle* is subdivided by a mid-aisle *handrail*.

4. Forty-two inches (1067 mm) for level or ramped *aisles* having seating on both sides.

**Exceptions:**

1. Thirty-six inches (914 mm) where the *aisle* serves less than 50 seats.

2. Thirty inches (762 mm) where the *aisle* does not serve more than 14 seats.

5. Thirty-six inches (914 mm) for level or ramped *aisles* having seating on only one side.

**Exception:** For other than ramped *aisles* that serve as part of an *accessible route*, 30 inches (762 mm) where the ramped *aisle* does not serve more than 14 seats.

**1029.9.2 Aisle catchment area.**

The *aisle* shall provide sufficient capacity for the number of persons accommodated by the catchment area served by the *aisle*. The catchment area served by an *aisle* is that portion of the total space served by that section of the *aisle*. In establishing catchment areas, the assumption shall be made that there is a balanced use of all *means of egress*, with the number of persons in proportion to egress capacity.

**1029.9.3 Converging aisles.**

Where *aisles* converge to form a single path of egress travel, the required capacity of that path shall be not less than the combined required capacity of the converging aisles.

**1029.9.4 Uniform width and capacity.**

Those portions of *aisles*, where egress is possible in either of two directions, shall be uniform in minimum width or required capacity.

**1029.9.5 Dead end aisles.**

Each end of an *aisle* shall be continuous to a cross *aisle*, foyer, doorway, vomitory, concourse or *stairway* in accordance with Section 1029.9.7 having access to an *exit*.

**Exceptions:**

1. Dead-end *aisles* shall be not greater than 20 feet (6096 mm) in length.
2. Dead-end *aisles* longer than 16 rows are permitted where seats beyond the 16th row dead-end *aisle* are not more than 24 seats from another *aisle*, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.
3. For *smoke-protected assembly seating*, the dead end *aisle* length of vertical *aisles* shall not exceed a distance of 21 rows.
4. For *smoke-protected assembly seating*, a longer dead-end *aisle* is permitted where seats beyond the 21-row dead-end *aisle* are not more than 40 seats from another *aisle*, measured along a row of seats having an *aisle* accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

#### **1029.9.6 Aisle measurement.**

The clear width for *aisles* shall be measured to walls, edges of seating and tread edges except for permitted projections.

**Exception:** The clear width of *aisles* adjacent to seating at tables shall be permitted to be measured in accordance with Section 1029.12.1.

##### **1029.9.6.1 Assembly aisle obstructions.**

There shall not be obstructions in the minimum width or required capacity of *aisles*.

**Exception:** *Handrails* are permitted to project into the required width of stepped *aisles* and ramped *aisles* in accordance with Section 1014.8.

#### **1029.9.7 Stairways connecting to stepped aisles.**

A *stairway* that connects a stepped *aisle* to a cross *aisle* or concourse shall be permitted to comply with the assembly *aisle* walking surface requirements of Section 1029.13. Transitions between *stairways* and stepped *aisles* shall comply with Section 1029.10.

#### **1029.9.8 Stairways connecting to vomitories.**

A *stairway* that connects a vomitory to a cross *aisle* or concourse shall be permitted to comply with the assembly *aisle* walking surface requirements of Section 1029.13. Transitions between *stairways* and stepped *aisles* shall comply with Section 1029.10.

#### **1029.10 Transitions.**

Transitions between *stairways* and stepped *aisles* shall comply with either Section 1029.10.1 or 1029.10.2.

### **1029.10.1 Transitions and stairways that maintain stepped aisle riser and tread dimensions.**

Stepped *aisles*, transitions and *stairways* that maintain riser and tread dimensions shall comply with Section 1029.13 as one *exit access* component.

### **1029.10.2 Transitions to stairways that do not maintain stepped aisle riser and tread dimensions.**

Transitions to *stairways* from stepped *aisles* with riser and tread dimensions that differ from the *stairways* shall comply with Sections 1029.10.2.1 through 1029.10.3.

#### **1029.10.2.1 Stairways and stepped aisles in a straight run.**

Transitions where the *stairway* is a straight run from the stepped *aisle* shall have a minimum depth of 22 inches (559 mm) where the treads on the descending side of the transition have greater depth and 30 inches (762 mm) where the treads on the descending side of the transition have lesser depth.

#### **1029.10.2.2 Stairways and stepped aisles that change direction.**

Transitions where the *stairway* changes direction from the stepped *aisle* shall have a minimum depth of 11 inches (280 mm) or the stepped *aisle* tread depth, whichever is greater, between the stepped *aisle* and *stairway*.

### **1029.10.3 Transition marking.**

A distinctive marking stripe shall be provided at each *nosing* or leading edge adjacent to the transition. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide. The edge marking stripe shall be distinctively different from the stepped *aisle* contrasting marking stripe.

### **1029.11 Construction.**

*Aisles*, stepped *aisles* and ramped *aisles* shall be built of materials consistent with the types permitted for the type of construction of the building.

**Exception:** Wood *handrails* shall be permitted for all types of construction.

#### **1029.11.1 Walking surface.**

The surface of *aisles*, stepped *aisles* and ramped *aisles* shall be of slip-resistant materials that are securely attached. The surface for stepped *aisles* shall comply with Section 1011.7.1.

#### **1029.11.2 Outdoor conditions.**

Outdoor *aisles*, stepped *aisles* and ramped *aisles* and outdoor approaches to *aisles*, stepped *aisles* and ramped *aisles* shall be designed so that water will not accumulate on the walking surface.

### **1029.12 Aisle accessways.**

*Aisle accessways* for seating at tables shall comply with Section 1029.12.1. *Aisle accessways* for seating in rows shall comply with Section 1029.12.2.

### **1029.12.1 Seating at tables.**

Where seating is located at a table or counter and is adjacent to an *aisle* or *aisle accessway*, the measurement of required clear width of the *aisle* or *aisle accessway* shall be made to a line 19 inches (483 mm) away from and parallel to the edge of the table or counter. The 19-inch (483 mm) distance shall be measured perpendicular to the side of the table or counter. In the case of other side boundaries for *aisles* or *aisle accessways*, the clear width shall be measured to walls, edges of seating and tread edges.

**Exception:** Where tables or counters are served by *fixed seats*, the width of the *aisle* or *aisle accessway* shall be measured from the back of the seat.

#### **1029.12.1.1 Aisle accessway capacity and width for seating at tables.**

*Aisle accessways* serving arrangements of seating at tables or counters shall comply with the capacity requirements of Section 1005.1 but shall not have less than 12 inches (305 mm) of width plus  $\frac{1}{2}$  inch (12.7 mm) of width for each additional 1 foot (305 mm), or fraction thereof, beyond 12 feet (3658 mm) of aisle accessway length measured from the center of the seat farthest from an *aisle*.

**Exception:** Portions of an *aisle accessway* having a length not exceeding 6 feet (1829 mm) and used by a total of not more than four persons.

#### **1029.12.1.2 Seating at table aisle accessway length.**

The length of travel along the *aisle accessway* shall not exceed 30 feet (9144 mm) from any seat to the point where a person has a choice of two or more paths of egress travel to separate *exits*.

### **1029.12.2 Clear width of aisle accessways serving seating in rows.**

Where seating rows have 14 or fewer seats, the minimum clear *aisle accessway* width shall be not less than 12 inches (305 mm) measured as the clear horizontal distance from the back of the row ahead and the nearest projection of the row behind. Where chairs have automatic or self-rising seats, the measurement shall be made with seats in the raised position. Where any chair in the row does not have an automatic or self-rising seat, the measurements shall be made with the seat in the down position. For seats with folding tablet arms, row spacing shall be determined with the tablet arm in the used position.

**Exception:** For seats with folding tablet arms, row spacing is permitted to be determined with the tablet arm in the stored position where the tablet arm when raised manually to vertical position in one motion automatically returns to the stored position by force of gravity.

#### **1029.12.2.1 Dual access.**

For rows of seating served by *aisles* or doorways at both ends, there shall be not more than 100 seats per row. The minimum clear width of 12 inches (305 mm) between rows

shall be increased by 0.3 inch (7.6 mm) for every additional seat beyond 14 seats where seats have backrests or beyond 21 where seats are without backrests. The minimum clear width is not required to exceed 22 inches (559 mm).

**Exception:** For *smoke-protected assembly seating*, the row length limits for a 12-inch-wide (305 mm) *aisle accessway*, beyond which the *aisle accessway* minimum clear width shall be increased, are in Table 1029.12.2.1.

**TABLE 1029.12.2.1 SMOKE-PROTECTED ASSEMBLY AISLE ACCESSWAYS**

TOTAL NUMBER OF SEATS IN THE SMOKE- PROTECTED ASSEMBLY SEATING	MAXIMUM NUMBER OF SEATS PER ROW PERMITTED TO HAVE A MINIMUM 12-INCH CLEAR WIDTH AISLE ACCESSWAY			
	Aisle or doorway at both ends of row		Aisle or doorway at one end of row only	
	Seats with backrests	Seats without backrests	Seats with backrests	Seats without backrests
Less than 4,000	14	21	7	10
4,000	15	22	7	10
7,000	16	23	8	11
10,000	17	24	8	11
13,000	18	25	9	12
16,000	19	26	9	12
19,000	20	27	10	13
22,000 and greater	21	28	11	14

For SI: 1 inch = 25.4 mm.

### 1029.12.2.2 Single access.

For rows of seating served by an *aisle* or doorway at only one end of the row, the minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.6 inch (15.2 mm) for every additional seat beyond seven seats where seats have backrests or beyond 10 where seats are without backrests. The minimum clear width is not required to exceed 22 inches (559 mm).

**Exception:** For *smoke-protected assembly seating*, the row length limits for a 12-inch-wide (305 mm) *aisle accessway*, beyond which the *aisle accessway* minimum clear width shall be increased, are in Table 1029.12.2.1.

### 1029.13 Assembly aisle walking surfaces.

Ramped *aisles* shall comply with Sections 1029.13.1 through 1029.13.1.3.

Stepped *aisles* shall comply with Sections 1029.13.2 through 1029.13.2.4.

#### 1029.13.1 Ramped aisles.

*Aisles* that are sloped more than one unit vertical in 20 units horizontal (5-percent slope) shall be considered a ramped *aisle*. Ramped *aisles* that serve as part of an *accessible route* in accordance with Sections 1009 and 1108.2 shall have a maximum slope of one

unit vertical in 12 units horizontal (8-percent slope). The slope of other ramped *aisles* shall not exceed one unit vertical in 8 units horizontal (12.5-percent slope).

#### **1029.13.1.1 Cross slope.**

The slope measured perpendicular to the direction of travel of a ramped *aisle* shall not be steeper than one unit vertical in 48 units horizontal (2-percent slope).

#### **1029.13.1.2 Landings.**

Ramped *aisles* shall have landings in accordance with Sections 1012.6 through 1012.6.5. Landings for ramped *aisles* shall be permitted to overlap required *aisles* or cross *aisles*.

#### **1029.13.1.3 Edge protection.**

Ramped *aisles* shall have edge protection in accordance with Sections 1012.10 and 1012.10.1.

**Exception:** In assembly spaces with *fixed seating*, edge protection is not required on the sides of ramped *aisles* where the ramped *aisles* provide access to the adjacent seating and *aisle accessways*.

#### **1029.13.2 Stepped aisles.**

*Aisles* with a slope exceeding one unit vertical in eight units horizontal (12.5-percent slope) shall consist of a series of risers and treads that extends across the full width of *aisles* and complies with Sections 1029.13.2.1 through 1029.13.2.4.

##### **1029.13.2.1 Treads.**

Tread depths shall be not less than 11 inches (279 mm) and shall have dimensional uniformity.

**Exception:** The tolerance between adjacent treads shall not exceed  $\frac{3}{16}$  inch (4.8 mm).

##### **1029.13.2.2 Risers.**

Where the gradient of stepped *aisles* is to be the same as the gradient of adjoining seating areas, the riser height shall be not less than 4 inches (102 mm) nor more than 8 inches (203 mm) and shall be uniform within each *flight*.

#### **Exceptions:**

1. Riser height nonuniformity shall be limited to the extent necessitated by changes in the gradient of the adjoining seating area to maintain adequate sightlines. Where nonuniformities exceed  $\frac{3}{16}$  inch (4.8 mm) between adjacent risers, the exact location of such nonuniformities shall be indicated with a distinctive marking stripe on each tread at the *nosing* or leading edge adjacent to the nonuniform risers. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide. The edge marking stripe shall be distinctively different from the contrasting marking stripe.

2. Riser heights not exceeding 9 inches (229 mm) shall be permitted where they are necessitated by the slope of the adjacent seating areas to maintain sightlines.

**1029.13.2.2.1 Construction tolerances.**

The tolerance between adjacent risers on a stepped *aisle* that were designed to be equal height shall not exceed  $\frac{3}{16}$  inch (4.8 mm). Where the stepped *aisle* is designed in accordance with Exception 1 of Section 1029.13.2.2, the stepped *aisle* shall be constructed so that each riser of unequal height, determined in the direction of descent, is not more than  $\frac{3}{8}$  inch (9.5 mm) in height different from adjacent risers where stepped *aisle* treads are less than 22 inches (560 mm) in depth and  $\frac{3}{4}$  inch (19.1 mm) in height different from adjacent risers where stepped *aisle* treads are 22 inches (560 mm) or greater in depth.

**1029.13.2.3 Tread contrasting marking stripe.**

A contrasting marking stripe shall be provided on each tread at the *nosing* or leading edge such that the location of each tread is readily apparent when viewed in descent. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide.

**Exception:** The contrasting marking stripe is permitted to be omitted where tread surfaces are such that the location of each tread is readily apparent when viewed in descent.

**1029.13.2.4 Nosing and profile.**

*Nosing* and riser profile shall comply with Sections 1011.5.5 through 1011.5.5.3.

**1029.14 Seat stability.**

In a building, room or space used for assembly purposes, the seats shall be securely fastened to the floor.

**Exceptions:**

1. In a building, room or space used for assembly purposes or portions thereof without ramped or tiered floors for seating and with 200 or fewer seats, the seats shall not be required to be fastened to the floor.
2. In a building, room or space used for assembly purposes or portions thereof with seating at tables and without ramped or tiered floors for seating, the seats shall not be required to be fastened to the floor.
3. In a building, room or space used for assembly purposes or portions thereof without ramped or tiered floors for seating and with greater than 200 seats, the seats shall be fastened together in groups of not less than three or the seats shall be securely fastened to the floor.



4. In a building, room or space used for assembly purposes where flexibility of the seating arrangement is an integral part of the design and function of the space and seating is on tiered levels, not more than 200 seats shall not be required to be fastened to the floor. Plans showing seating, tiers and *aisles* shall be submitted for approval.

5. Groups of seats within a building, room or space used for assembly purposes separated from other seating by railings, *guards*, partial height walls or similar barriers with level floors and having not more than 14 seats per group shall not be required to be fastened to the floor.

6. Seats intended for musicians or other performers and separated by railings, *guards*, partial height walls or similar barriers shall not be required to be fastened to the floor.

#### **1029.15 Handrails.**

Ramped *aisles* having a slope exceeding one unit vertical in 15 units horizontal (6.7-percent slope) and stepped *aisles* shall be provided with *handrails* in compliance with Section 1014 located either at one or both sides of the *aisle* or within the *aisle* width.

#### **Exceptions:**

1. *Handrails* are not required for ramped *aisles* with seating on both sides.
2. *Handrails* are not required where, at the side of the *aisle*, there is a *guard* with a top surface that complies with the graspability requirements of *handrails* in accordance with Section 1014.3.
3. *Handrail* extensions are not required at the top and bottom of stepped *aisles* and ramped *aisles* to permit crossovers within the *aisles*.

#### **1029.15.1 Discontinuous handrails.**

Where there is seating on both sides of the *aisle*, the mid-aisle *handrails* shall be discontinuous with gaps or breaks at intervals not exceeding five rows to facilitate access to seating and to permit crossing from one side of the *aisle* to the other. These gaps or breaks shall have a clear width of not less than 22 inches (559 mm) and not greater than 36 inches (914 mm), measured horizontally, and the mid-aisle *handrail* shall have rounded terminations or bends.

#### **1029.15.2 Handrail termination.**

*Handrails* located on the side of stepped *aisles* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent stepped *aisle* flight.

#### **1029.15.3 Mid-aisle termination.**

Mid-aisle *handrails* shall not extend beyond the lowest riser and shall terminate within 18 inches (381 mm), measured horizontally, from the lowest riser. *Handrail* extensions are not required.

**Exception:** Mid-aisle *handrails* shall be permitted to extend beyond the lowest riser where the *handrail* extensions do not obstruct the width of the cross *aisle*.

#### **1029.15.4 Rails.**

Where mid-aisle *handrails* are provided in stepped *aisles*, there shall be an additional rail located approximately 12 inches (305 mm) below the *handrail*. The rail shall be adequate in strength and attachment in accordance with Section 1607.8.1.2.

#### **1029.16 Assembly guards.**

*Guards* adjacent to seating in a building, room or space used for assembly purposes shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015 except where provided in accordance with Sections 1029.16.1 through 1029.16.4. At *bleachers*, *grandstands* and *folding and telescopic seating*, *guards* must be provided where required by ICC 300 and Section 1029.16.1.

##### **1029.16.1 Perimeter guards.**

Perimeter *guards* shall be provided where the footboards or walking surface of seating facilities are more than 30 inches (762 mm) above the floor or grade below. Where the seatboards are adjacent to the perimeter, *guard* height shall be 42 inches (1067 mm) high minimum, measured from the seatboard. Where the seats are self-rising, *guard* height shall be 42 inches (1067 mm) high minimum, measured from the floor surface. Where there is an *aisle* between the seating and the perimeter, the *guard* height shall be measured in accordance with Section 1015.2.

#### **Exceptions:**

1. *Guards* that impact sightlines shall be permitted to comply with Section 1029.16.3.
2. *Bleachers*, *grandstands* and *folding and telescopic seating* shall not be required to have perimeter *guards* where the seating is located adjacent to a wall and the space between the wall and the seating is less than 4 inches (102 mm).

##### **1029.16.2 Cross aisles.**

Cross *aisles* located more than 30 inches (762 mm) above the floor or grade below shall have *guards* in accordance with Section 1015.

Where an elevation change of 30 inches (762 mm) or less occurs between a cross *aisle* and the adjacent floor or grade below, *guards* not less than 26 inches (660 mm) above the *aisle* floor shall be provided.

**Exception:** Where the backs of seats on the front of the cross *aisle* project 24 inches (610 mm) or more above the adjacent floor of the *aisle*, a *guard* need not be provided.

##### **1029.16.3 Sightline-constrained guard heights.**

Unless subject to the requirements of Section 1029.16.4, a fascia or railing system in

accordance with the *guard* requirements of Section 1015 and having a minimum height of 26 inches (660 mm) shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating.

#### **1029.16.4 Guards at the end of aisles.**

A fascia or railing system complying with the *guard* requirements of Section 1015 shall be provided for the full width of the *aisle* where the foot of the *aisle* is more than 30 inches (762 mm) above the floor or grade below. The fascia or railing shall be a minimum of 36 inches (914 mm) high and shall provide a minimum 42 inches (1067 mm) measured diagonally between the top of the rail and the *nosing* of the nearest tread.

### **SECTION 1030 EMERGENCY ESCAPE AND RESCUE**

#### **1030.1 General.**

In addition to the *means of egress* required by this chapter, provisions shall be made for *emergency escape and rescue openings* in Group R-2 occupancies in accordance with Tables 1006.3.2(1) and 1006.3.2(2) and Group R-3 occupancies. *Basements* and sleeping rooms below the fourth story above *grade plane* shall have at least one exterior *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, *emergency escape and rescue openings* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way*.

#### **Exceptions:**

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit door* or *exit access door* that opens directly into a *public way* or to a *yard*, *court* or exterior exit balcony that opens to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m<sup>2</sup>) in floor area shall not be required to have *emergency escape and rescue openings*.

#### **1030.2 Minimum size.**

*Emergency escape and rescue openings* shall have a minimum net clear opening of 5.7 square feet (0.53 m<sup>2</sup>).

**Exception:** The minimum net clear opening for grade floor *emergency escape and rescue openings* shall be 5 square feet (0.46 m<sup>2</sup>).

#### **1030.2.1 Minimum dimensions.**

The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

### **1030.3 Maximum height from floor.**

*Emergency escape and rescue openings* shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

### **1030.4 Operational constraints.**

*Emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys or tools. Bars, grilles, grates or similar devices are permitted to be placed over *emergency escape and rescue openings* provided the minimum net clear opening size complies with Section 1030.2 and such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the *emergency escape and rescue opening*. Where such bars, grilles, grates or similar devices are installed in existing buildings, *smoke alarms* shall be installed in accordance with Section 907.2.11 regardless of the valuation of the *alteration*.

### **1030.5 Window wells.**

An *emergency escape and rescue opening* with a finished sill height below the adjacent ground level shall be provided with a window well in accordance with Sections 1030.5.1 and 1030.5.2.

#### **1030.5.1 Minimum size.**

The minimum horizontal area of the window well shall be 9 square feet (0.84 m<sup>2</sup>), with a minimum dimension of 36 inches (914 mm). The area of the window well shall allow the *emergency escape and rescue opening* to be fully opened.

#### **1030.5.2 Ladders or steps.**

Window wells with a vertical depth of more than 44 inches (1118 mm) shall be equipped with an *approved* permanently affixed ladder or steps. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center (o.c.) vertically for the full height of the window well. The ladder or steps shall not encroach into the required dimensions of the window well by more than 6 inches (152 mm). The ladder or steps shall not be obstructed by the *emergency escape and rescue opening*. Ladders or steps required by this section are exempt from the *stairway* requirements of Section 1011.

## CHAPTER 29 PLUMBING SYSTEMS

### SECTION 2901 GENERAL

#### [P] 2901.1 Scope.

The provisions of this chapter and the *International Plumbing Code* shall govern the erection, installation, *alteration*, repairs, relocation, replacement, addition to, use or maintenance of plumbing equipment and systems. Toilet and bathing rooms shall be constructed in accordance with Section 1210. Plumbing systems and equipment shall be constructed, installed and maintained in accordance with the *International Plumbing Code*. Private sewage disposal systems shall conform to the *International Private Sewage Disposal Code*.

### SECTION 2902 MINIMUM PLUMBING FACILITIES

#### [P] 2902.1 Minimum number of fixtures.

Plumbing fixtures shall be provided in the minimum number as shown in Table 2902.1 based on the actual use of the building or space. Uses not shown in Table 2902.1 shall be considered individually by the code official. The number of occupants shall be determined by this code.

**[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES<sup>a</sup> (See Sections 2902.1.1 and 2902.2)**

N o.	CLASSIFICA TION	OCCUPA NCY	DESCRIPT ION	WATER CLOSETS (URINALS SEE SECTION 419.2 OF THE <i>INTERNATI ONAL PLUMBING CODE</i> )		LAVATOR IES		BATHTU BS/ SHOWER S	DRINKING FOUNTAINS (SEE SECTION 410 OF THE <i>INTERNATIO NAL PLUMBING CODE</i> )	OTH ER
				Male	Female	Mal e	Femal e			
1	Assembly (continued)	A-1 <sup>d</sup>	Theaters and other buildings for the per- forming arts and motion pictures	1 per 125	1 per 65	1 per 200		—	1 per 500	1 servic e sink
		A-2 <sup>d</sup>	Nightclubs, bars, tav-	1 per 40	1 per 40	1 per 75		—	1 per 500	1 servic

			erns, dance halls and buildings for similar purposes						e sink
			Restaurants, banquet halls and food courts	1 per 75	1 per 75	1 per 200	—	1 per 500	1 service sink
		A-3 <sup>d</sup>	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums	1 per 125	1 per 65	1 per 200	—	1 per 500	1 service sink
			Passenger terminals and transportation facilities	1 per 500	1 per 500	1 per 750	—	1 per 1,000	1 service sink
			Places of worship and other religious services	1 per 150	1 per 75	1 per 200	—	1 per 1,000	1 service sink

(continued)

**[P] TABLE 2902.1—(continued) MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES<sup>a</sup> (See Sections 2902.1.1 and 2902.2)**

N o.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2 OF THE INTERNATIONAL PLUMBING CODE)	LAVATORIES	BATHTUBS / SHOWERS	DRINKING FOUNTAINS (SEE SECTION 410 OF THE INTERNATIONAL PLUMBING CODE)	OTHER
---------	----------------	-----------	-------------	--	------------	--------------------------	--	-------

				Male	Female	Male	Female			
1	Assembly	A-4	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		A-5	Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	B	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses	1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink <sup>e</sup>

3	Educational	E	Educational facilities	1 per 50	1 per 50	—	1 per 100	1 service sink
4	Factory and industrial	F-1 and F-2	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials	1 per 100	1 per 100	See Section 411 of the <i>International Plumbing Code</i>	1 per 400	1 service sink
5	Institutional	I-1	Residential care	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		I-2	Hospitals, ambulatory nursing home care recipient <sup>b</sup>	1 per room <sup>c</sup>	1 per room <sup>c</sup>	1 per 15	1 per 100	1 service sink
			Employees, other than residential care <sup>b</sup>	1 per 25	1 per 35	—	1 per 100	—
			Visitors, other than residential care	1 per 75	1 per 100	—	1 per 500	—
		I-3	Prisons <sup>b</sup>	1 per cell	1 per cell	1 per 15	1 per 100	1 service sink
		I-3	Reformatories, detention centers and correctional centers <sup>b</sup>	1 per 15	1 per 15	1 per 15	1 per 100	1 service sink
			Employees <sup>b</sup>	1 per 25	1 per 35	—	1 per 100	—
		I-4	Adult day care and child day care	1 per 15	1 per 15	1	1 per 100	1 service sink

(continued)



**[P] TABLE 2902.1—continued MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES<sup>a</sup> (See Sections 2902.1.1 and 2902.2)**

No.	CLASSIFICATION	OCCUPANCY	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 419.2 OF THE INTERNATIONAL PLUMBING CODE)		LAVATORIES		BATHTUBS OR SHOWERS	DRINKING FOUNTAINS (SEE SECTION 410 OF THE INTERNATIONAL PLUMBING CODE)	OTHER
				Male	Female	Male	Female			
6	Mercantile	M	Retail stores, service stations, shops, salesrooms, markets and shopping centers	1 per 500		1 per 750		—	1 per 1,000	1 service sink <sup>e</sup>
7	Residential	R-1	Hotels, motels, boarding houses (transient)	1 per sleeping unit		1 per sleeping unit		1 per sleeping unit	—	1 service sink
		R-2	Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		R-2	Apartment house	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units

		R-3	One- and two-family dwellings and lodging houses with five or fewer guest rooms	1 per dwelling unit	1 per 10	1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		R-3	Congregate living facilities with 16 or fewer persons	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
		R-4	Congregate living facilities with 16 or fewer persons	1 per 10	1 per 10	1 per 8	1 per 100	1 service sink
8	Storage	S-1 S-2	Structures for the storage of goods, warehouses, store-houses and freight depots, low and moderate hazard	1 per 100	1 per 100	See Section 411 of the <i>International Plumbing Code</i>	1 per 1,000	1 service sink

- a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by this code.
- b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.
- c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient *sleeping unit* has direct access to the toilet room and provisions for privacy for the toilet room user are provided.
- d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.
- e. For business and mercantile occupancies with an occupant load of 15 or fewer, service sinks shall not be required.

**[P] 2902.1.1 Fixture calculations.**

To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

**Exception:** The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.

**[P] 2902.1.2 Family or assisted-use toilet and bath fixtures.**

Fixtures located within family or assisted-use toilet and bathing rooms required by Section 1109.2.1 are permitted to be included in the number of required fixtures for either the male or female occupants in assembly and mercantile occupancies.

**[P] 2902.2 Separate facilities.**

Where plumbing fixtures are required, separate facilities shall be provided for each sex.

**Exceptions:**

1. Separate facilities shall not be required for *dwelling units* and *sleeping units*.
2. Separate facilities shall not be required in structures or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.
3. Separate facilities shall not be required in mercantile occupancies in which the maximum occupant load is 100 or less.

**[P] 2902.2.1 Family or assisted-use toilet facilities serving as separate facilities.**

Where a building or tenant space requires a separate toilet facility for each sex and each toilet facility is required to have only one water closet, two family

or assisted-use toilet facilities shall be permitted to serve as the required separate facilities. Family or assisted-use toilet facilities shall not be required to be identified for exclusive use by either sex as required by Section 2902.4.

**[P] 2902.3 Employee and public toilet facilities.**

Customers, patrons and visitors shall be provided with public toilet facilities in structures and tenant spaces intended for public utilization. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 2902.1 for all users. Employees shall be provided with toilet facilities in all occupancies. Employee toilet facilities shall be either separate or combined employee and public toilet facilities.

**Exception:** Public toilet facilities shall not be required in:

1. Open or enclosed parking garages where there are no parking attendants.
2. Structures and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m<sup>2</sup>).

**[P] 2902.3.1 Access.**

The route to the public toilet facilities required by Section 2902.3 shall not pass through kitchens, storage rooms or closets. Access to the required facilities shall be from within the building or from the exterior of the building. Routes shall comply with the accessibility requirements of this code. The public shall have access to the required toilet facilities at all times that the building is occupied.

**[P] 2902.3.2 Location of toilet facilities in occupancies other than malls.**

In occupancies other than covered and open mall buildings, the required public and employee toilet facilities shall be located not more than one *story* above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

**Exception:** The location and maximum distances of travel to required employee facilities in factory and industrial occupancies are permitted to exceed that required by this section, provided that the location and maximum distance of travel are *approved*.

**[P] 2902.3.3 Location of toilet facilities in malls.**

In covered and open mall buildings, the required public and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 300 feet (91 m). In mall buildings, the required facilities shall be based on total square footage (m<sup>2</sup>) within a covered mall building or within the perimeter line of an open mall building, and facilities shall be installed in each individual store or in a central toilet area located in accordance with this section. The maximum distance of travel to central toilet facilities in mall buildings shall be measured from the main entrance of any store or tenant space. In mall buildings, where employees' toilet facilities are not provided in the individual store, the maximum distance of travel shall be measured from the employees' work area of the store or tenant space.

**[P] 2902.3.4 Pay facilities.**

Where pay facilities are installed, such facilities shall be in excess of the required minimum facilities. Required facilities shall be free of charge.

**[P] 2902.3.5 Door locking.**

Where a toilet room is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.

**[P] 2902.3.6 Prohibited toilet room location.**

Toilet rooms shall not open directly into a room used for the preparation of food for service to the public.

**[P] 2902.4 Signage.**

Required public facilities shall be provided with signs that designate the sex as required by Section 2902.2. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111.

**[P] 2902.4.1 Directional signage.**

Directional signage indicating the route to the required public toilet facilities shall be posted in a lobby, corridor, aisle or similar space, such that the sign can be readily seen from the main entrance to the building or tenant space.

**[P] 2902.5 Drinking fountain location.**

Drinking fountains shall not be required to be located in individual tenant spaces provided that public drinking fountains are located within a distance of travel of 500 feet (152 m) of the most remote location in the tenant space and

not more than one story above or below the tenant space. Where the tenant space is in a covered or open mall, such distance shall not exceed 300 feet (91 440 mm). Drinking fountains shall be located on an accessible route.

**[P] 2902.6 Small occupancies.**

Drinking fountains shall not be required for an occupant load of 15 or fewer.